An Evaluation of an Educational Intervention Aimed at Improving Confidence, Knowledge and Skill of University Students to Cook.

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D05235

Dissertation submitted in accordance with the requirements of the University of Chester for the degree of Master of Science (Public Health Nutrition).

March 2010

Acknowledgements

Dr. Basma Ellahi

Dr. Zehra Buyuktuncer

Mum, Dad and Brother

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Volunteers

Abstract

Introduction

It is well documented that first year university students, often away from home for the first time, have poor dietary habits which are widely accepted to contribute to serious health problems. Research suggests improving confidence, skill and knowledge to cook healthily is important to facilitate healthier eating behaviours amongst the student population. The aim of this study was to evaluate the impact of the educational intervention, Can't cook, don't cook on the confidence, skill and knowledge of first year students from the University of Chester to cook healthy foods.

Method

Students were recruited to take part in the intervention through the use of posters and flyers. The intervention comprised of three practical cooking sessions that included some classroom-based learning. Those who attended the intervention were asked to participate in the evaluation research, 14 males and 30 females doing so. The evaluation consisted of the completion of two questionnaires, pre- and post-intervention, measuring self-reported confidence, skill and knowledge to cook healthy food.

Results

There were significant increases in all aspects of confidence, skill and knowledge from participating in the intervention except for transport access to supermarkets. Students reported achieving five portions of fruit and vegetables a day more frequently post-intervention and there was also a positive increase in the confidence of using various cooking methods post-intervention compared to pre-intervention. There were little differences between genders, the only significant difference was that of females that attaching more importance to healthy eating prior to the intervention that their male counterparts ($p=0.003$).

Conclusion

Participation in the intervention increased the confidence, basic skill and knowledge in university students equipping them with the tools to buy and cook cheap, healthy meals for themselves. A healthier, well balanced diet can help to eliminate the risk of poor health and the onset of disease that literature implies students are at risk of. Although there are many barriers to healthy eating students living in university halls of residence face, engaging, hands-on cooking sessions for this population can help to overcome some of them. The effectiveness of a nutrition educational intervention for university students was demonstrated regardless of their age, gender and degree programme and is a recommendable method to improve the eating behaviours in this group.

DECLARATION OF ORIGINAL WORK

I hereby declare that work contained in herewith is original and entirely my own work (unless stated otherwise). It has not been previously submitted in support of a degree, qualification or other course.

Lloyd Bristow

WORD COUNT: 16,135 words

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CHAPTER 1

INTRODUCTION

It is widely accepted that a poor diet has implications on health (Ha & Caine-Bish, 2009; House, Su & Levy-Milne, 2006). Poor food habits are associated with an increased risk of health problems later on in life. High levels of salt, saturated fat and sugar in ones diet contribute to the development of chronic illnesses such as obesity, non-insulin dependent diabetes, and cardiovascular disease (The Cabinet Office, 2008; Ha & Caine-Bish, 2009). In England, obesity alone was estimated costing the National Health Service (NHS) £4.2 billion in 2007 with the cost spiralling to an estimated £6.3 billion in 2015 (Martin, 2008). The World Health Organisation (WHO) believes 2.7 million deaths (4.9%) worldwide are due to a lack of fruit and vegetables intake (WHO, 2002) and thus puts strong emphasis on the need for individuals to increase their fruit and vegetable intake in their worldwide strategy on health (Winkler & Turell, 2009). Consequently, the focal point of local health promotion policies is the role diet can have in preventing such illnesses and health costs. Effecting positive changes in dietary habits is one of the major health challenges facing the government and health professionals alike (Buttriss, Stanner, McKevith, Nugent, Kelly, Phillips & Theobald, 2004) and is one challenge that is needed to be overcome.

It is considered that the development of an unhealthy diet and lifestyle can be established in a student population during their first year of university living independently from the family home as many students face the full responsibility of shopping and preparing food for themselves for the first time

(Garcia, Henry & Zok, 2000). Food habits established during this ‘’period of significant change’’ at university are likely to be maintained for life (Ha & Caine-Bish, 2009, p103). Away from parental control, it is thought university students are at increased exposure to, for example, cigarettes and alcohol and it's this environment that is thought to manifest unhealthy behaviours, that includes unhealthy food intake (Keller, 2009). Evidence from several studies suggest on average, undergraduate students commonly consume unhealthy diets high in salt, saturated fat and sugar and low in fruit and vegetables (Papadaki, Hondros, Scott & Kapsokefalou, 2007; Larson, Perry, Story & Neumark-Sztainer, 2006; Levy & Auld, 2004). Students also have a tendency to frequently snack on energy-dense foods, skip meals often including breakfast and regularly watch television, adopting sedentary lifestyles (Levy & Auld, 2004; Widenhorn-Muller, Hille, Klenk & Weiland, 2008).

These findings support the need of an educational intervention in cooking to promote healthier diet and lifestyles. Poor dietary practices in students such as these may be due to a lack of confidence to cook, low skill levels, poor knowledge of food. As there is no current course to develop the confidence, skills, and knowledge of undergraduate students to cook healthy meals at the University of Chester, the Can’t cook, don’t cook intervention will provide an essential and beneficial learning experience for the students.

The purpose of the present study is to evaluate a University of Chester based nutrition education programme ‘Can’t cook, don’t cook run by nutrition students for first year students at the University of Chester.

The aim of the study is to evaluate changes in confidence level, cooking skill, knowledge and dietary behaviour of first year students after participating in a cooking based educational intervention undertaken in the department of Biological Sciences of the University of Chester. The evaluation will involve a pre and post intervention questionnaire to assess change.

Using fellow students as volunteers to help run the course of cooking sessions will potentially provide credible role models to empower what each student participant experiences with the likelihood they put into practice socially what they have learned from the Can't cook, don't cook programme. The use of peer education in a student nutrition programme by Garcia, Henry & Zok (2000) was found to be beneficial in attracting students to attend the sessions which witnessed a high level of interaction between programme deliverers and participants.

Therefore the objectives of this research are to:

- evaluate the impact the intervention has made on the students in relation to food choice

- evaluate the impact on improved confidence in the students to cook for themselves

- assess change in knowledge of food and how to cook

- assess altered student behaviour to improve health and well-being

The research hypotheses are as follows:

- Participation of first year students in a cooking intervention will significantly increase their confidence to cook for themselves.
- Participation of first year students in a cooking intervention will significantly increase their knowledge of food and skills on how to cook it.
- Participation of first year students in a cooking intervention will change their behaviour towards consuming healthy foods

The evaluation will provide an insight into student confidence, skill and knowledge of cooking healthy meals and assess the use of a hands-on educational intervention to increase these variables, with the ultimate goal of improving the dietary habits of undergraduate students.

CHAPTER 2

REVIEW OF LITERATURE

For the purpose of this literature review, evidence of the need to improve the diet of the student population and factors affecting student dietary habits and their ability to cook healthy food will be appraised. The best ways to promote positive dietary changes in this target population will also be reviewed.

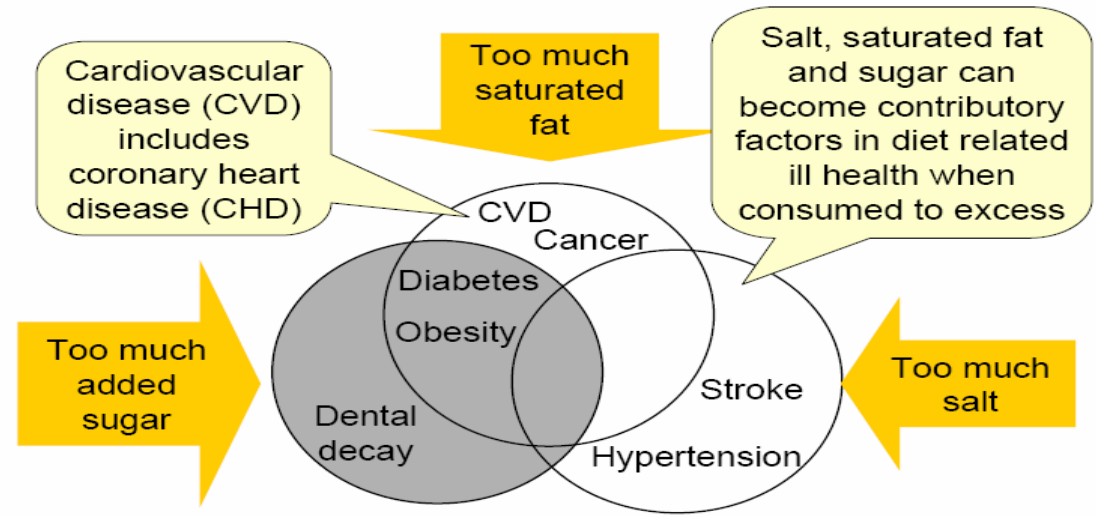
2.1 Importance of Healthy Eating

The university environment, with the lack of parental control, increased level of socializing and increased exposure to risky practices is seen to be a prime setting for the manifestation of unhealthy behaviours (Keller, 2009). For first year students coming to university, it may be the first time they have been away from the family home for a long period as well as the first time they have to fend for themselves, especially with the shopping for and the cooking of food. This can often lead to the increased consumption of energy-dense snacks, ready-made and takeaway food partly because of a lack of confidence, skill and knowledge in cooking healthy meals that arises due to a lack of experience.

The National Diet and Nutrition Survey (NDNS) shows that on average, the population of the United Kingdom (U.K.) consumes too much salt, saturated fat and non-milk extrinsic sugars (NMES, sugars that are not contained within the cell structure of food, such as honey and table sugar) (National Diet and Nutrition Survey, 2004). A diet rich in salt, saturated fat and sugar as well as a lack of fruit and vegetables is likely to accelerate the

development and progression of the major causes of morbidity and mortality (Thiele, Mensink, & Beitz, 2004). It has been well documented that high salt intake is associated with high blood pressure, which can increase the risk of stroke and heart disease (The Cabinet Office, 2008). High saturated fat intake is associated with an increased risk of obesity, cancer and cardiovascular disease and high amounts of sugar in the diet can contribute to dental decay, obesity and type 2 diabetes mellitus (The Cabinet Office, 2008).

Figure 1: The Relationship between Diet and Health



(The Cabinet Office, 2008)

According to the Food Standards Agency (FSA, 2009a), a '*healthy diet*' is based on fruits and vegetables and breads, cereals and other starchy foods. Moderate amounts of milk and dairy products as well as meat, fish or

milk/meat alternatives must also be included with limited, if any foods and drinks high in fat and/or sugar, as depicted in figure 2.

Figure 2: The Eatwell Plate

(FSA, 2009a)

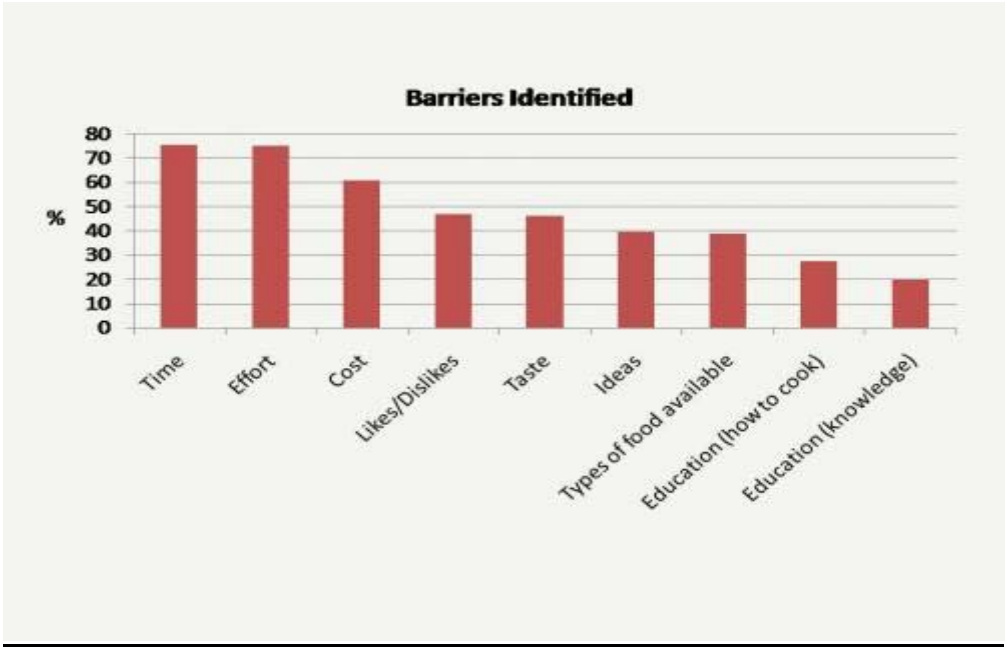
Young adults aged 19 – 24 were found to consume higher amounts of pasta, rice, cereals, savoury snacks and soft drinks and less fruit, vegetables, fish and fish dishes than older age groups (National Diet and Nutrition Survey, 2004). Levitsky, Halbmaier, & Mrdjenovic (2004) established that during the first 12 period of university, 20% of weight gained by students can be accredited to a diet of ‘’high fat’’ snack foods. Research also shows that the majority of students do not achieve the recommended five fruit and vegetables portions a day (Keller, 2009), only 3.8% of their student sample (n=1262) reporting that they do. Not only is fruit and vegetables good sources of fibre, helping to maintain a healthy gut and promote satiety, they contain vitamins and minerals, such as vitamins A and C, calcium, potassium

and phyto-chemicals which are known to for their disease fighting properties (Primarolo, 2008).

2.2 Factors Affecting Food Choice

Food choice is defined as 'the selection of foods for consumption, which results from the competing, reinforcing and interacting influences of a variety of factors' by the FSA (Buttriss et al, 2004, p.29). These factors can be sensory, physiological and psychological and is partly influenced by social and environmental constructs. Current literature on these factors and other barriers which impact on obtaining a healthy, balanced diet in the student population are discussed here. Figure 3 shows results from a survey on university students living in halls of residence into the barriers they come across regarding cooking healthy food.

Figure 3: Common barriers to healthy eating as identified by students



(Mission:Nutrition, 2008)

Student life provides ‘’the opportunity to engage in a wide range of activities that may not be offered within the remainder of their adult life-cycles’’ (Dobson & Ness, 2009, p.661). Cooking healthful food may be not at the top of the list of priorities for students. Time has to be allocated for social events, household tasks, shopping, eating and laundry according to Dobson and Ness (2009). Lack of finance is a frequently-mentioned disadvantage of being a student (Mintel, 2002) which can be attributed to poor food choices. With rising tuition fees, knowing how to survive on a budget is essential to student well-being. However, evidence has suggested there lies an increased awareness of the importance of healthy diet and nutrition, although students admit to problems in following a healthy diet because of cost, more limited shelf life and lack of convenience (Mintel, 2006).

2.2.1 Food Access

Often without their own form of transport, students may have to walk or use public transport to access supermarkets and as a consequence, they maybe more reliant on smaller shops. These smaller ‘convenience’ shops typically stock a limited range of foods, their prices tend to be higher than large supermarkets and fresh food is sometimes of lesser quality (Barrett, 1997). Barrett (1997) suggests that people on tight budgets shop in local shops to eliminate travel costs, but by doing so, they are unable to take advantage of the economies of scale offered by large supermarkets. Barrett’s findings emphasise the impact of geographical and social mobility has on the food we choose. This possible selection of foods with poor nutritional quality by students may be due to transport constraints but may also be due to a lack of

nutritional knowledge indicating a need to improve nutritional knowledge amongst the student population.

2.2.2 Sedentary Lifestyle

Buckworth and Nigg (2004) found sedentary lifestyles common in the student population with male students spending more time watching television / videos and using the computer than their female counterparts. Thomson, Spence, Raine and Laing (2008) found associations among television watching, energy-dense snack consumption, and snacking behaviour in undergraduate students and high use of television/video was associated with more unhealthful dietary behaviours among girls and boys in a study by Utter, Neumark-Sztainer, Jeffrey, and Story (2003).

2.2.3 Sleep Deprivation

Another common aspect of student life is the erratic sleep patterns of students (Hicks, McTighe & Juarez, 1986) which can be because of socializing, coursework or changeable daily timetables to name a few. A study into the effects of sleep deprivation on food consumption in the student population discovered students chose foods based less on reasons of health, sensory appeal, natural content and price after sleep loss (Wells & Cruess, 2006). Eating diaries of 50 undergraduate students displayed an average decrease of 272 calories over a four day period of sleep loss with an increase of the consumption of unhealthy snacks. Capricious sleep patterns may also affect the frequency of breakfast consumption with the skipping of this meal common in the student population (Beerman et al, 1990). The time

between the evening meal and breakfast is often the longest period without glucose and nutrient uptake. Amigo and Fernandez (2007) found that abstinence of nutrition at breakfast-time was usually compensated by the consumption of foods high in fat and sugar, which represents a much higher intake of calories than a normal breakfast. Other research suggests omitting breakfast may result in metabolic changes that interfere with cognitive function and learning and impair the availability of glucose or nutrients, thus affecting neurotransmission and the functioning of the central nervous system (Bellisle, 2004). As breakfast is often labelled as the most important meal of the day and with the omission of breakfast common in the student population, it is paramount that the benefits of breakfast are ingrained in students.

2.2.4 Alcohol Consumption

It is no surprise to hear students frequently consume alcohol. Research by Johnston, O'Malley, Bachman, & Schulenberg (2006) has shown university students in the U.S. have more occasions of heavy drinking (defined as 5 or more drinks in a row) than non-students of the same age. This so called 'binge drinking' (women – 7 UK units, men – 10 UK units consumed in one session) can impact on food choice. Alcoholic beverages contribute 7kcal/g and little to the nutritional requirements of the body, and are often substitutes for food (Kokavec, 2008). As Lloyd-Richardson, Lucero, DiBello, Jacobson and Wing (2008) discovered, alcohol consumption negatively affected the food choices of college freshman in their study into the relationship between alcohol and eating behaviours (table 2.1).

Table 2.1: Table adapted from Lloyd-Richardson et al (2008) showing the effects of alcohol on the eating habits of moderate-risk drinkers in their first year at University

	Moderate risk drinkers (%)
Eating habits after drinking	
Ate junk food after drinking on half of drinking episodes or more	83.1
Made less healthy food choices after drinking on half of drinking episodes or more	77.5
Felt that drinking increased their appetite	50.7

Long-term alcohol intake can decrease the total amount of food consumed, effecting blood sugar levels. Keen to replace a loss of glucose through excessive alcohol consumption, drinkers often crave foods high in fat and sugar, fundamentally leading to energy imbalance and weight gain (Thomas & Bishop, 2007).

2.2.5 Residence

It appears student residence also has an impact on students' eating habits. Beerman et al., (1990) detected university students living independently on-campus skipped meals more frequently and consumed higher amounts of food high in fat and sugar than off-campus students. This consumption pattern is still observed nowadays which is backed up by the findings of Harker, Sharma, Harker & Reinhard (2009). Answering their research question, does a difference exist in food motives and the serves of food by

the type of residence (dependent or independent) [in university students]? Harker et al (2009) noticed students living in the family home (dependent living) consumed significantly higher servings of bread, meat, fish, poultry, eggs, nuts and legumes with a higher degree of frequency than students living independently.

It seems that moving away from the family home and taking on the responsibility for food preparation and purchasing affects student dietary habit (Papadaki, Hondros, Scott & Kapsokefalou, 2007). Papadaki et al (2007) found that students (n=84) living away from home consumed fewer home-cooked meals (4.17 v 6.52 meals/wk, $p<0.001$) and more convenience meals (2.08 v 1.22 meals/wk, $p=0.008$) compared with students still residing at home. More unfavourable eating habits were found in independent-living students, with a decreased weekly intake of fresh fruit and vegetables, oily fish and seafood and an increased intake of sugar, alcohol and fast food (Papadaki et al, 2007). This was thought to be due to a lack of experience, and therefore confidence in the kitchen, corroborating the importance of an intervention for students living away from home to attempt to increase their confidence, skill and knowledge in cooking. They concluded that because of the lack of healthy dietary habits in the student population putting them at greater risk of the development of chronic diseases later in life (NHS, 2009), nutritional interventions in the student population should be encouraged to promote healthier diets and lifestyles.

The quality of cooking facilities in student residence must be taken into consideration when reviewing their cooking and eating habits. Students with

limited cooking facilities and/or equipment will be limited to the food they can prepare regardless of confidence, skill or knowledge in cooking and may rely on ready-to-eat foods that remove the need for cooking skills as well as much kitchen equipment in order to put food on the table (Caraher & Lang, 1999).

2.2.6 Experience and Knowledge

In a review of food technology in secondary schools in the U.K (Ofsted, 2009) it appears pupils, parents and head teachers have expressed their concerns about food technology (home economics) in the curriculum to government officials and inspectors. This was due to the feeling that too little time is spent learning to cook nutritious meals. Home economics lessons have been cut in recent years, and alongside a decrease in cooking at home there are fewer opportunities for young people to see how to prepare food and gain experience and knowledge in cooking that would breed confidence (Margetts, 2004). Flaws in the education of the importance of healthy diet and lifestyles can only hinder the development of a habitual healthy diet, especially in adolescents. Ha and Caine-Bish (2009) claim habits developed in adolescents and young adulthood are often maintained for life. Without the practical experience and adequate education of the importance of healthy living at secondary school, students arriving at university may develop unhealthy eating habits and be ill-equipped to cook nutritious foods for themselves.

However, the UK government have introduced a Food in School's programme supporting the teaching and learning of healthful eating in the

National Curriculum as well as Personal Social and Health Education (PSHE) lessons in secondary schools that teach the benefits of good nutrition (Department of Health, 2010). This can potentially increase the knowledge of food and nutrition in students and equip them with the know-how to cook healthy meals for themselves if/when they move away from home to higher education (i.e. university), although much evidence contradicts this.

A survey into food safety in undergraduate students (n=354) indicated students are engaging in risky food consumption and handling behaviours, more so than members of the general population (Morrone & Rathbun, 2005). With little or no cooking experience, it is unsurprising some students are unaware of the dangers of food-borne illness from cooking or the steps taken to conduct safe practice in the kitchen and eliminate risk. The salient nature of environmental health and food safety in universities and the evidence from the study by Morrone & Rathbun suggests this issue needs addressing, especially in the self-catering student population. Understanding safe food handling and preparation can only help eliminate the risk of illness whilst increasing confidence to cook using fresh and raw ingredients. In conclusion, Morrone & Rathbun (2005) agree that teaching students how to keep themselves and others around them safe from food-borne pathogens should be an important goal of colleges and universities.

Literature also suggests students, especially male students would benefit from a programme learning to read and understand food labels (Downes, Probart & Mattes, 1995; Arceneaux & Fournet, 1996). Although the majority

of students perceived food labels to be useful (90%) and easy to read (70%) in a study into label use in college students (n=184), there was an inherent distrust of the truthfulness and accuracy of food labels (Downes et al, 1995). One third of the subjects in a study by Misra (2007) shared the belief that labels are not accurate, and two thirds believed nutrition claims are not truthful, and half believed health claims are not truthful. Downes at al. (1995) aimed to evaluate comprehension of food labelling in the university student using tests and questionnaires. 57% of their student sample reported reading food labels, largely looking at fat and calorie content with the sample having an 81% success rate in tests. However, their findings discovered that although students read food labels, they are unable to interpret key areas of the basic food label information including calculating percentage calories from fat or adjusting information for different individual needs. This emphasises the requirement of educating students to interpreting food labels with the proposed outcome of healthier food choices among students.

2.2.7 Confidence

Confidence was found to be a barrier to food preparation and dietary choices in an adult community in areas of social deprivation (Wrieden et al., 2006). Wrieden et al (2006) recognised dealing with any one barrier to dietary change is unlikely radically to alter eating behaviour but food skills interventions can be a useful starting point for initiating dietary change. Through their community-based food skills intervention, Wrieden et al (2006) noted a small but positive effect on food choice and confidence in food preparation with the percentage of participants (n=113) expressing

confidence in cooking following a recipe and cooking certain dishes increased (67% - 90%). They found this quantitative increase in the percentage of participants reporting that they cooked from basic ingredients which was confirmed by qualitative evaluations. Kubota and Freedman (2009) reported similar findings. They noted a significant increase ($P<0.05$) in self-efficacy of food preparation from participation in a cooking skills development intervention.

2.3 Gender Differences

Gender, the socially determined personal and psychological characteristics associated with being male or female, also has a part to play in the food we choose.

A study on Lebanese university students (n=220) found female students show healthier eating habits compared to male students in terms of daily breakfast intake and significantly, meal frequency ($p=0.001$) (Yahia, Achkar, Abdallah & Rixk, 2008). On examination of food choice behaviours in young adults, gender differences in food choices appeared to be attributable to women's greater weight control involvement and to their stronger beliefs in healthy eating (Wardle, Haase, Steptoe, Nillapun, Jonwutiwes & Bellisle, 2004). They saw similar patterns across such disparate cultures with varied cuisines. Gender differences associated with food choices were also found in a study on college students' food decisions (n=358), whereby female subjects scored higher than men on factors associated with food choices that promote a healthy lifestyle, such as attention to label information or healthiness of their choices (Levi, Chan & Pence, 2006). Studies have also

shown female students have a greater intake of fruit and vegetables than male students (Keller, 2009; Deshmukh-Taskar, Nicklas, Yang & Berenson, 2007). These differences may arise due to cultural habits, fashion and body image that women attach much more importance to than males do in deciding the food they eat (Babicz-Zielinska, 2001; Beardsworth et al., 2002). Women often want to be thinner and men, depending on their perceived body shape, almost equally wanting to be thinner or heavier (Beardsworth et al., 2002). This is often portrayed in the media and can unsurprisingly alter the amount or type of food intake. For example, the Yorkie chocolate bar has the slogan 'it's not for girls!', being depicted as a masculine food. This gendering of food can impact on food choice irrespective of confidence, skill level of cooking and knowledge of healthy food.

2.4 Evidence Recommending Intervention

Wengreen and Moncur (2009) observed changes in weight, dietary intake and health-related behaviours among first-year university students (n=186). They noted that 23% of participants gained ≥5% of their baseline body weight in the first semester of university associated with change in behaviours that impact energy balance. They supported the implementation of educational interventions to limit weight gain in the student population.

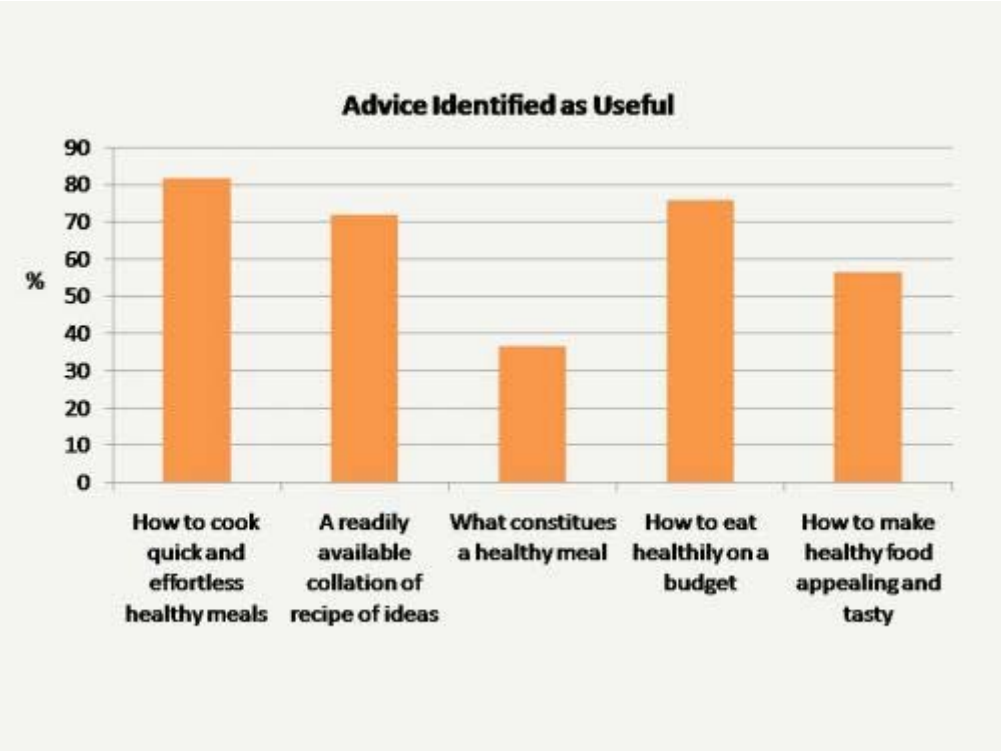
Kolodinsky et al (2007) used internet-based food surveys for students and declared that nutritional knowledge was related to making more healthy choices in every aspect of the survey. With a lack of knowledge and information on nutrition, students may not be aware of the consequences of a poor diet. Mazier and McLeod (2007) stated that students entering the

university environment for the first time usually lack nutritional knowledge, especially concerning fats. They proved knowledge of identifying and understanding fats can be significantly increased ($p=<0.005$) through the undertaking of a basic nutrition course and recommended nutrition-related courses be readily available to students at university.

Yahia et al (2008) findings of the eating habits of university students indicate that students would benefit from a nutrition and health promotion programme to improve students' eating habits. A similar study to the Can't cook, don't cook intervention undertaken by university student athletes, focusing on simple, quick, and healthful snacks, was found to be a fun, useful and informative way to promote healthy eating and increase food preparation skills (White, Burgoon, Sabbert & Ahlgren, 2001). However, both participants and programme leaders agreed more challenging recipes would improve the programme.

The findings of a Larson et al (2001) study into food preparation in young adults support the value of university-based courses that teach young adults skills for healthy food preparation with emphasis on basic cooking skills, making healthful food purchases on a budget and ideas for planning quick, balanced meals. Figure 4 shows what advice students found useful in regards to cooking (Mission: Nutrition, 2008).

Figure 4: A lowdown of what advice students find useful concerning cooking



(Mission: Nutrition, 2008)

2.5 Behaviour Change

Peer-led programmes often assume engaging people through their own social networks increases adoption of behaviour change (Buttriss et al., 2004) and have been known to be beneficial in attempting to change dietary behaviour in young people, including students (Garcia et al., 2000). However, there is limited evidence of the sustainability of such interventions.

Interventions that allow individuals to understand the consequences of their behaviour (ie, poor dietary habits increase the risk of health problems), plan for change, recognise barriers they must overcome (ie, confidence and skill to cook) are essential for changes in attitude and behaviour.

Theory-based activities have been described as favourable tools to increase awareness of the roles and functions of food, promote active contemplation, activate decision making and facilitate the engagement of voluntary chosen change (Contento, 2007). Many theories can be applied to an educational intervention such as Can't cook, don't cook. Petty and Cacioppo (cited in Levi, Chan & Pence, 2006) see the strategies to change students' food choices and knowledge must start with cognition (changes in one's beliefs), affect (lead to changes in attitudes), and behaviour (resulting in changes in behaviour). Their Elaboration Likelihood Model (ELM) suggests that motivation through emotion alone will not result in an attitude change. Levi et al (2006) believe a positive change in attitude and behaviour is achievable with a person's high involvement in an issue, reinforcing the ELM and implying a 'hands-on' intervention with high student involvement will benefit the students far more than cooking demonstrations for example. Using this belief, students will be more likely to implement more healthful changes to their food choice and maintain their positively changed attitude and behaviour towards healthy eating. Levy & Auld (2004) looked at college students' knowledge, attitudes and behaviours toward cooking by comparing the outcome of cooking demonstration classes (n=32) against hands-on cooking classes (n=33). Using pre- and post-tests they found the hands-on intervention group experienced more statistically significant gains in attitudes towards healthy eating and cooking and appeared to have a better pattern of positive shifts in cooking-related knowledge and behaviours than students that had undergone cooking demonstrations. The outcome of a culinary camp summer cooking programme to improve cooking behaviours in

adolescents by Beets, Swanger, Wilcox & Cardinal (2007) is consistent with Levy & Aulds findings. Hands-on cooking experiences by the participants revealed significant improvements in knowledge and perceived cooking ability.

It has been suggested that individuals' actions are determined by their perception of reality rather than reality itself (Bandura, 1986). Social Learning Theory (SLT) can also be tied into the use of a hands-on educational intervention. SLT states that if people observe positive outcomes in what they are observing, then they are more likely to imitate and adopt the behaviour themselves (Bandura, 1986). SLT is often used in health education and behaviour programs and has been successfully used in previous dietary improvement interventions (Ha & Caine-Bish, 2009).

A common model used in behaviour change is Prochaska and DiClemente's transtheoretical / stages of change model shown in figure 5.

Figure 5: The Transtheoretical / Stages of Change Model

Adult Meduaction (2006)

Evidence implies that many first-year students are at the pre-contemplation stage on the stages of change model. For example, Keller (2009) recognised first-year students generally reported being relatively unwilling to change their behaviours with only 6.5% ready to change their risk behaviours in the near future. This reiterates the need of an intervention to prepare students to change unhealthful eating habits and maximise the maintenance of positive changes in dietary behaviour. An educational intervention is more likely to be effective if individual practices of the target group are focused upon as well as being able to identify factors influencing the behaviours of the target audience (Contento, 2007).

Evidence has found that people are generally more willing to change food behaviour for the better for cosmetic reasons, such as illness or a desire to lose weight (Buttriss et al., 2004), however, increasing confidence and skill to cook healthy foods can help expand the choice of food students can prepare in the hope these choices are predominantly healthy.

2.6 Details of Intervention

The intervention was designed to raise the awareness of the barriers to healthy eating in the student population highlighted in the review of literature and help the students overcome them. Photo's from which can be found in the supplementary appendix.

A nutrition education approach was adopted to attempt to modify behaviour. Research has shown nutrition education is more likely to be effective if the behaviours and factors influencing these behaviours of the desired group are known prior to an intervention enabling practices to be tailored specifically to the target audience (Contento, 2007).

Although Levy & Auld (2004) acknowledge cooking demonstrations alone can reach larger audiences in varied settings, the impact of increasing confidence, cooking skills and the number of home-prepared meals is likely to be weaker than high involvement, hands-on cooking classes. Based on these findings, a hands-on approach was chosen to maximise and strengthen the possible gains in confidence, skill and knowledge the intervention delivers.

Based on the findings of current literature and the FSA's tips for students (FSA, 2009b), the intervention endeavoured to discuss and deliver these helpful tips to the intervention participants aiming to increase their knowledge of and changing their attitude towards food, shopping and cooking. During classroom time, discussions concerning budgeting, food shopping and storage were aired. The intervention encouraged making food from basic, fresh ingredients to help save money and mentioned the importance to stick to a budget. Quick demonstrations were also used to help students with basic skills such using a sharp knife safely, chopping onions, handling pastry and to render a bland product into a nutritious meal.

The eatwell plate was covered in the first session with explanation of its objective, making the students aware of the different food groups and the proportion suggested of each to contribute to a healthy, balanced diet. Research has shown a lack of time is a common barrier to healthful eating in the student population (Larson et al, 2006; House, Su, & Levy-Milne, 2006; Mission: Nutrition, 2008). An American study into the food-preparation behaviours of young adults aged 18-23 years, which is the same age category of our participants, found the most common barrier to food preparation was also a lack of time (Larson et al). 36% of their sample (n=1710) reported lack of time as a reason for being unprepared when it came to preparing healthful meals. Evidence prompted the meals cooked in the intervention to be quick and easy to make, hoping to overcome this barrier. Although, content of each session became progressively more challenging with more elaborate recipes used in the final session, a

recommendation from the evaluation of a student cooking intervention by White et al (2001).

Students were informed of ways to store the food, limit waste and use up left-over's, even suggesting cooking in batches and freezing it in serving-sized portions to have at a later date. Planning meals so any food bought doesn't go off was also encouraged in the interventions, with all these tips being enforced by the volunteers during the cooking sessions.

Also, during classroom discussions, a map of the area around the university was displayed showing each student where the nearest supermarket was to their residence (supplementary appendix). This aimed to improve the access to food the students had, encouraging them to use the supermarkets ahead of expensive convenience shops in the local student area and take advantage of the 'economies of scale' and cheaper 'home brands' supermarkets have to offer (Barrett, 1997, p.65).

Food hygiene was touched on before entering the food skills laboratory to cook (supplementary appendix). Simple safe procedures were addressed to comply with health and safety regulations and limit the risk of food-borne illness. It was deemed necessary as research has found university students are unaware of the dangers of poor food preparation and handling (Morrone & Rathbun, 2005).

A fun multiple choice quiz (supplementary appendix) was introduced at the start of the second session. It asked various food and nutrition questions in an attempt to gauge the knowledge of each student group. Each answer was

given and explained, hopeful the students learned a little bit from it. Fun, interactive and engaging activities have been found to be beneficial to promote positive behaviour changes (Levy & Auld, 2004). By the end of each session, the students would have completed the cooking of a meal and can then compare this to the purchase of the ready-made equivalent in terms of its nutrition, ease of preparation, price, and general food labelling. The focus of which was raising awareness in relation to key nutrition messages, such as high intakes of salt, saturated fats and sugars. It also covered the skills gap in interpreting food labels highlighted in current literature (Downes et al, 2005; Arceneaux & Fournet, 1996).

The full session plans for the intervention can be found in appendix A.

Acquiring the skill to cook from basics is highly beneficial as it provides a platform from which individuals can develop their cooking skills which can open up a new world of foods, tastes and textures (Caraher & Lang, 1999). With the basic principles of cooking in place, experimenting with different foods and cuisines is a future premise following on from the Can't cook, don't cook sessions.

Student delivery of the sessions was thought to be highly advantageous to the study with research showing the use of peer educators help give students the opportunity to interact with someone of their age, understand their needs better and are seen as credible sources of nutrition information (Garcia et al., 2000). Also, peer education has been found to be beneficial in attracting students to attend and participate (Garcia et al., 2000).

The sessions were planned around the participants' timetable with sessions running three to four times weekly with the pretence of this increasing the probability of attendance, often at the same time as when the students would eat their evening meal. The progression of the set of Can't cook, don't cook sessions for each group was determined by what the students wanted to cook and what information they wanted to discuss further, carried out via post-it notes at the end of each session. This 'collaborative intervention' approach allowed the intervention to be flexible and more responsive to any issues brought up by participants, helping to shape consequent sessions. It acknowledges the desired outcomes cannot always be achieved and takes into account the human, social, behavioural and cultural factors that can interfere with the implementation of the intervention (Abma, 2005).

Each session included no more than 15 participants. This abided by health and safety regulations of the food skills laboratory used but also allowed greater participation in the preparation and cooking of food by each student.

The intervention consisted of many qualitative elements too. Classroom discussions of where the cohort shopped for food and how much they were likely to spend on food per week attempted to gain an insight into the students' shopping habits. The students were also asked to write down on post-it notes the reasons why they chose to attend the intervention and what they hoped to get out of the sessions. After each session, the students were asked to comment on how they found the session with information on how they felt the session(s) can be improved, again using post-it notes. However, qualitative data will not be used in this report.

However, we must acknowledge that the aim of the Can't cook, don't cook intervention to improve confidence, skill and knowledge of cooking may not lead to healthier diets and eating habits in the students. The other above mentioned barriers to healthy eating also play an influential role in what students decide to eat and must be taken into consideration.

This quantitative study aims to evaluate changes in confidence level, cooking skill, knowledge and dietary behaviour of first year students after participating in a cooking based educational intervention that tackle many of the above-mentioned barriers to healthy eating. The research hypotheses are:

- Participation of first year students in a cooking intervention will significantly increase their confidence to cook for themselves.
- Participation of first year students in a cooking intervention will significantly increase their knowledge of food and skills on how to cook it.
- Participation of first year students in a cooking intervention will change their behaviour towards consuming healthy foods.

CHAPTER 3

METHODOLOGY

3.1 Study Summary

This research is an evaluation of the Can't cook, don't cook intervention. The evaluation research aimed to improve the nutritional skill of undergraduate students at the University of Chester. The project was evaluated to address the research questions noted in the previous chapter. The educational intervention, Can't cook, don't cook took place in the fully equipped food skills lab at the University of Chester campus. It consisted of three sessions with students cooking different dishes each time. Each participant was asked to fill a questionnaire at baseline and again at the end of the third and final session. The impact of the sessions on participants' self-reported confidence, skill and knowledge to cook healthy food will be evaluated in this report via the pre- and post-intervention questionnaires with given consent of the intervention participants.

3.2 Study Design

In an attempt to promote a healthy university and address the skills gap apparent in the student population outlined in the review of literature, the Department of Biological Sciences at the University of Chester and Student Guidance Service (SGS) helped to fund the Can't cook, don't cook intervention and its subsequent evaluation. This study used pre- and post-intervention questionnaires to evaluate the intervention. The only aim of the questionnaires was to assess the students' level of confidence to cook, skills

to cook and knowledge of healthy foods pre- and post-intervention, determining any changes. Knowledge was related to the questions on food choice and food access asked. The questionnaires also helped to establish the drop-out rate, defining who started the intervention and who completed it.

3.3 Ethical Issues

Ethical approval for the evaluation was attained from the Faculty of Applied and Health Sciences Research Ethics Committee at the University of Chester in November 2009 (appendix B)**.** All participants gave informed consent to take part in the evaluation research.

Ethical approval ensures the data remains credible and of a high quality. The intervention ensured:

1. Participants knew their attendance was voluntary and were free to withdraw at any time.
2. No participant was put under pressure to complete the questionnaires or the programme as a whole.
3. Participants had given prior consent before participating
4. Participants remained anonymous. Nicknames or pseudonyms were used instead of real names on the questionnaires, which were only accessible by the researcher and kept under the strictest of confidence.

3.4 Subjects

The evaluation research required a representative sample of undergraduate students at the University of Chester. Through exploration of similar studies, a sample of 65 students was calculated primarily based on data from Wreiden et al (2006). A previous intervention by Levy and Auld (2004) conducted hands-on cooking classes used 33 participants and aimed to measure changes in attitude, knowledge and behaviour in regards to cooking. They acknowledged that this sample size was insufficient as they found no statistical differences on any outcome measure. A small sample such as this does not represent the general undergraduate student population so with the addition of 10% to allow for drop-out, 72 was the sample size required from the evaluation.

3.5 Recruitment of Sample

Participants of the Can't cook, don't cook intervention were recruited to participate in the evaluation. Students were first recruited to the intervention using flyers and posters (supplementary appendix) that were approved by the Student Guidance Service (SGS) and Health4work with the adherence to university protocol. The posters were displayed all around the university campus including undergraduate halls of residence. Hall of residence wardens were informed of the Can't cook, don't cook programme and promoted it in meetings with their undergraduate residents. Flyers were handed out to students around campus, used for its inexpensive and audience specific nature in recruitment**.** Participants took part in the evaluation on an entirely voluntary basis. Participants selected themselves,

expressing an interest in participating in the intervention and therefore the evaluation. These students were asked to fill out a screening tool (appendix C) that provided the researcher with the information to either include or exclude the student to participate in the evaluation research in accordance with the set criteria.

Inclusion criteria: students that attended the intervention and were living in self- or semi-catered accommodation that were not studying a nutritional based degree were welcomed to participate.

Exclusion criteria: students that attended the intervention and were living in catered accommodation or those undertaking a nutritional based degree were not eligible to participate in the study.

Volunteers were also recruited to assist the participants during the cooking sessions. This was done through the Volunteering Scheme at the University of Chester under the criteria that each volunteer is from a current nutrition programme and/or had experience and an interest in cooking.

3.6 Data Collection Tools and Processes

Interviews were considered in data collection due to their ability to obtain highly personalised data with opportunities to explain the questions, thus limiting misinterpretation of questions asked. However, questionnaires were subsequently chosen due to their quick, objective nature of data collection (Boynton & Greenlaugh, 2004) that limited cost and time consumption of the researcher.

Although studies have found questionnaires to be problematic to participants who are unable to read or follow the questionnaire (Boynton & Greenlaugh, 2004), this was not a problem encountered in this study as participants were of a high academic and literacy level. Students studying at the University of Chester must pass the International English Language Testing System (IELTS) as a requirement of study, which eliminated the need for any pilot testing of the questionnaires.

Pre- and post questionnaires (appendices D and E respectively) allowed the before and after data to be compared and was necessary to evaluate the participant's reported changes. Current literature was reviewed in search of validated questionnaires for use in an educational intervention into the cooking confidence, skill and knowledge, however no such instrument of relevance was identified. A self-developed questionnaire enabled the research questions of this evaluation study to be answered competently, as it required a specificity and relevance to achieve useful data from the Can't cook, don't cook intervention. Questions were selected to provide measurable, numerical data for each research variable, some adapted from a previous questionnaire evaluating a community cook scheme (Gregg, 2006). Research has shown that more than one item is needed to address each identified content area (Dornyei, 2003), so for example, assessing confidence in cooking would need questions aimed at the same target (ie, assessing confidence in cooking) but would draw upon slightly different aspects of it. This aided the design of the questionnaire. Each outcome

variable consisted of two or more questions to gain a composite score for each.

The questions concerning cooking confidence and cooking skills enabled scores to be obtained whilst drawing on slightly different aspects of each section. The food choice question concerning food labels was chosen to show changes, if any in interpreting food labels as it was discussed during the sessions. Other questions in this section aimed to show any changes to their eating habits and cooking methods pre- and post-intervention. After discussing supermarket access and showing the students where each supermarket was to their residence and how to get there, the food access questions aimed to discover if any changes to the students' shopping habits occurred.

Questionnaires were administered during the sessions to ensure a maximum return rate. Each questionnaire included a participant information sheet (appendix F), providing each participant with details of the intervention, and a consent form (appendix G), that each participant signed if they were happy for the data from the questionnaires to be used in this evaluation research. For ethical reasons and to maintain anonymity, nicknames or pseudonyms were used by the participants when completing the questionnaires so no individual was identifiable. Completed questionnaires were held in a secure setting, only accessible by the researcher for confidentiality purposes.

The only personal information obtained from the pre- and post questionnaires were the participants' gender and age. This helped to determine any gender differences in the variables and distinguish patterns

between genders or age group. Current Literature has found many distinguishing aspects of dietary behaviour between genders. Females have been shown to make more positive food decisions promoting a healthy lifestyle, for example, such as attention to label information or healthiness of their food than men (Levi, Chan & Pence, 2006).

3.7 Data Analysis

The data collected in this study was quantitative, categorical nominal data. Data analysis comprised of descriptive and inferential statistics. The variables were checked for normal distribution via the Shapiro-Wilk statistic and appropriate descriptive statistics were then generated**.** Mean scores and standard deviation would have been calculated for each pre- and post-intervention question and variable in-turn if the data was normally distributed. For each of the variables a paired t-test would have been conducted on the pre and post questionnaire data following confirmation that the data is normally distributed. The variables are confidence in cooking, cooking skills, food choice and food access. However, all but a few questions failed normality, so the non-parametric Wilcoxon test was adopted and median and range were used. Gender comparisons were also conducted. All data was analysed using the Statistical Package for the Social Sciences (SPSS) for Windows (version 17.0) and statistical significance was set at the 0.05 level (P value). A P value result of less than or equal to 0.05 was considered as statistically significant.

For the intervention to be conceived as effective, self-reported confidence, skill level and knowledge of cooking healthy foods of the participants should

increase. Other outcomes can merely determine if a hands-on cooking programme for undergraduate students is a successful tool for health promotion and can inform future work in the field.

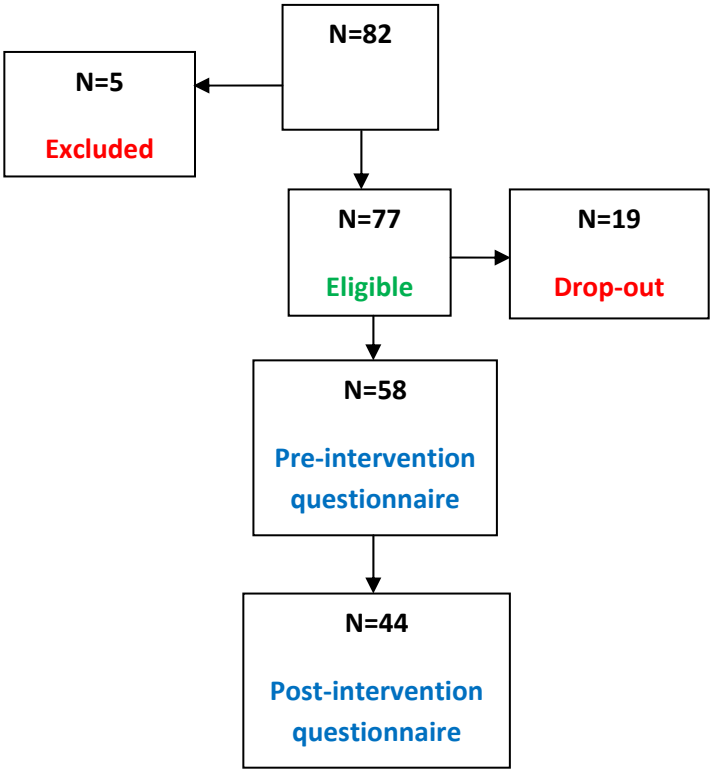
CHAPTER 4

RESULTS

4.1 Response and Attrition Rates

Eighty-two students agreed to participate in the intervention, five of which were excluded due to their ineligibility under the inclusion criteria of the study. Seventy-seven individuals were eligible to attend the intervention. Of the remaining seventy-seven, fifty-eight agreed to participate in the evaluation research and attended the first intervention session. However, only forty-four students of the fifty-eight completed the full three sessions.

Figure 6: Recruitment and response of participants



From the 77 eligible participants, the study experienced a disappointing 43% drop out rate. From the 58 students who attended a first session of the intervention, there was a 24% drop in students completing the intervention.

4.2 Data Analysis

A Shapiro-Wilk test was conducted on the variables to check the normality of distribution. Only a few questions were found to be distributed normally so the non-parametric test, the Wilcoxon test was conducted on all questions using SPSS for Windows (version 17.0). The majority of questions asked required a numeric answer on scale of 1-10. This data provided a minimum and maximum score for each numerical question with a median score for each question and variable. Pre- and post-intervention scores were compared. The significance in any pre- and post-intervention differences was determined using the Wilcoxon test, with statistical significance set at the 0.05 level. A P value result of less than or equal to 0.05 was considered statistically significant.

4.3 Descriptive Statistics (n=58)

Data from the 58 students that attended a first intervention session are shown below. Due to 14 individuals dropping out of the intervention at this stage, this data is used for descriptive purposes only.

Table 4.1: Demographics of students that attended a first intervention session (n=58)

	Age Range	Median Age
Male (n=19)	18 – 22	19
Female (n=39)	18 – 23	19
Total (n=58)	**18-23**	**19**

Table 4.2: Self-reported confidence in cooking scores pre-intervention (n=58)

N=58	Pre-Intervention		
	score related to confidence in cooking	score related to how easy cooking is found to be	score related to ability to cook from fresh ingredients
Median (min-max)	6 (1-10)	6 (1-9)	6 (1-10)

Table 4.3: Self-reported cooking skill scores pre-intervention (n=58)

N=58	Pre-Intervention		
	score related to confidence using sharp knives to prepare food	score related to confidence using a frying pan to cook	score related to knowing cooking times of foods
Median (min-max)	7 (1-10)	7 (1-10)	6 (1-9)

Table 4.4: Self-reported food choice scores pre-intervention (n=58)

N=58	Pre-Intervention	
	score related to confidence interpreting food labels	score related to importance attached to healthy eating
Median (min-max)	6 (1-10)	7 (3-10)

Figure 7: The participant frequency of achieving 5 fruit and vegetable portions daily pre-intervention (n=58)

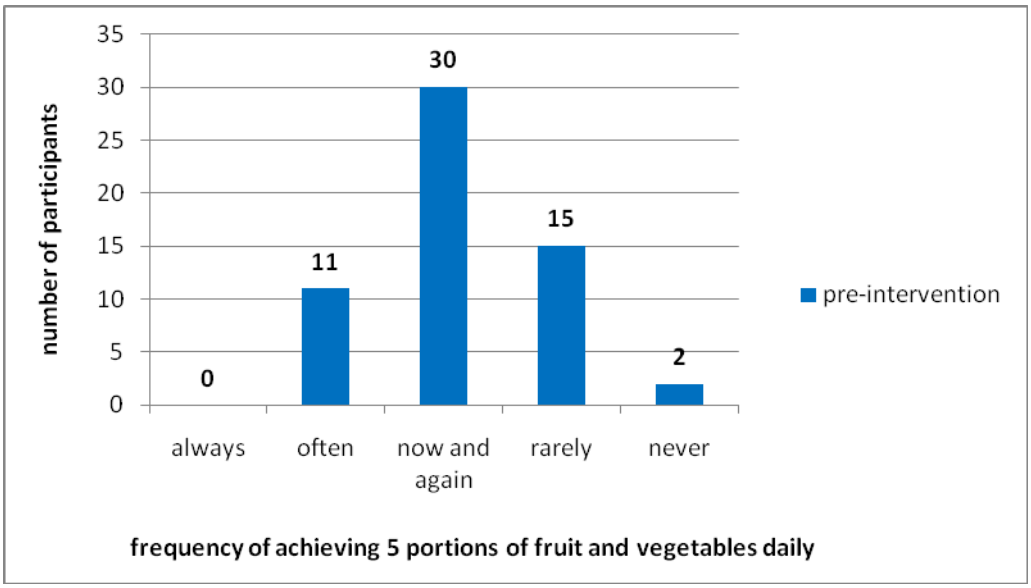


Figure 8: The participant frequency of cooking methods they were confident in using pre-intervention (n=58)

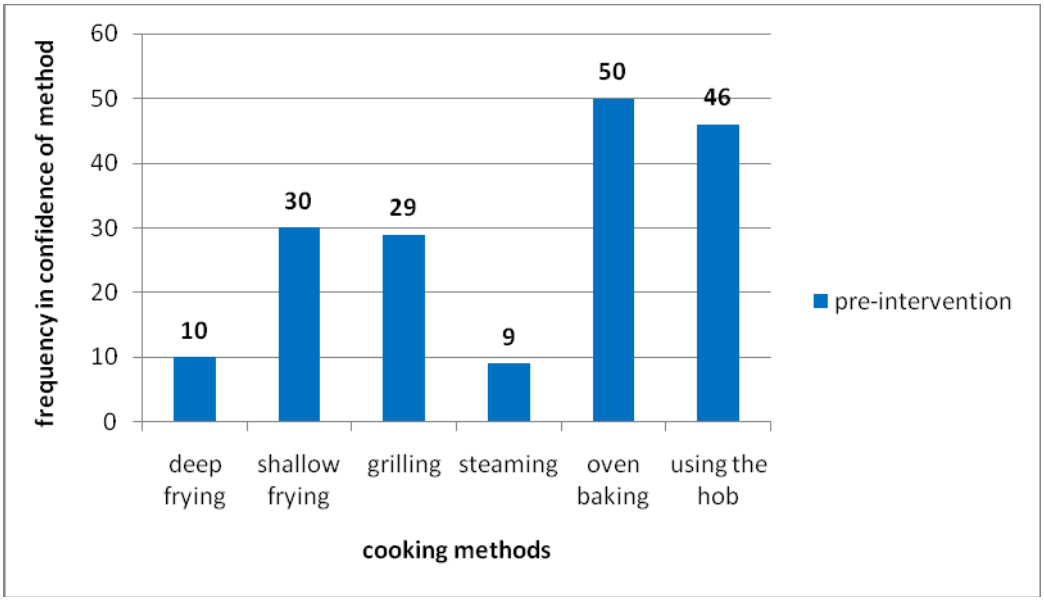


Table 4.5: Self-reported access to food scores pre-intervention (n=58)

N=58	Pre-Intervention	
	score related to ease of supermarket access	score related to how much transport affects food shopping
Median (min-max)	8 (2-10)	7 (1-10)

4.4 Pre-Intervention v Post-Intervention (n=44)

Forty-four students participated in the full intervention, 14 males and 30 females who were living independently in self- or semi-catered halls of residence at the University of Chester. 44 pre- and 44 post-questionnaires were completed for analysis, results of which are depicted below.

Table 4.6: Demographics of study population (n=44)

	Age Range	Median Age
Male (n=14)	18 - 22	19
Female (n=30)	18 - 23	19
Total (n=44)	**18-23**	**19**

Around two-thirds of the sample was female (68%), the rest being male (32%). The study sample was aged between 18 and 23 years old. The median age of the sample was 19, typical of first year undergraduate students.

Table 4.7: A comparison of self-reported confidence in cooking scores pre- and post-intervention with level of significance (n=44)

	Pre-Intervention	Post-Intervention	
Confidence	Median (min-max)	Median (min-max)	P value
score related to confidence in cooking	6 (1-10)	8 (2-10)	.000
score related to how easy cooking is found to be	6 (1-9)	7 (3-10)	.000
score related to ability to cook from fresh ingredients	6 (1-10)	7.5 (3-10)	.000

P ≤0.05 indicates significant result

There were significant differences in every aspect of confidence to cook. Each aspect of confidence to cook increased from pre- to post-intervention. The median score for self-rated confidence in cooking increased from 6 pre-

intervention to 8 post-intervention (P =0.000). The median score for how easy students found cooking to be increased from 6 to 7 (P=0.000). The median score for self-rated ability to cook from fresh ingredients increased from 6 to 7.5 (P=0.000).

Table 4.8: A comparison of self-reported cooking skill scores pre- and post-intervention with level of significance (n=44)

	Pre-Intervention	Post-Intervention	
Skill	Median (min-max)	Median (min-max)	P value
score related to confidence using sharp knives to prepare food	7 (1-10)	8 (5-10)	.000
score related to confidence using a frying pan to cook	7 (1-10)	8 (4-10)	.000
score related to knowing cooking times of foods	5 (1-9)	7 (2-9)	.000

P ≤0.05 indicates significant result

There were significant differences in every aspect of cooking skills. Each aspect of cooking skill increased from pre- to post-intervention. The median score for self-rated confidence of using sharp knives increased from 7 to 8 (P=0.000). The median score for self-rated confidence using a frying pan to cook increased from 7 to 8 (P=0.000). The median score for self-rated knowledge of cooking times of food increased from 5 to 7 (P=0.000).

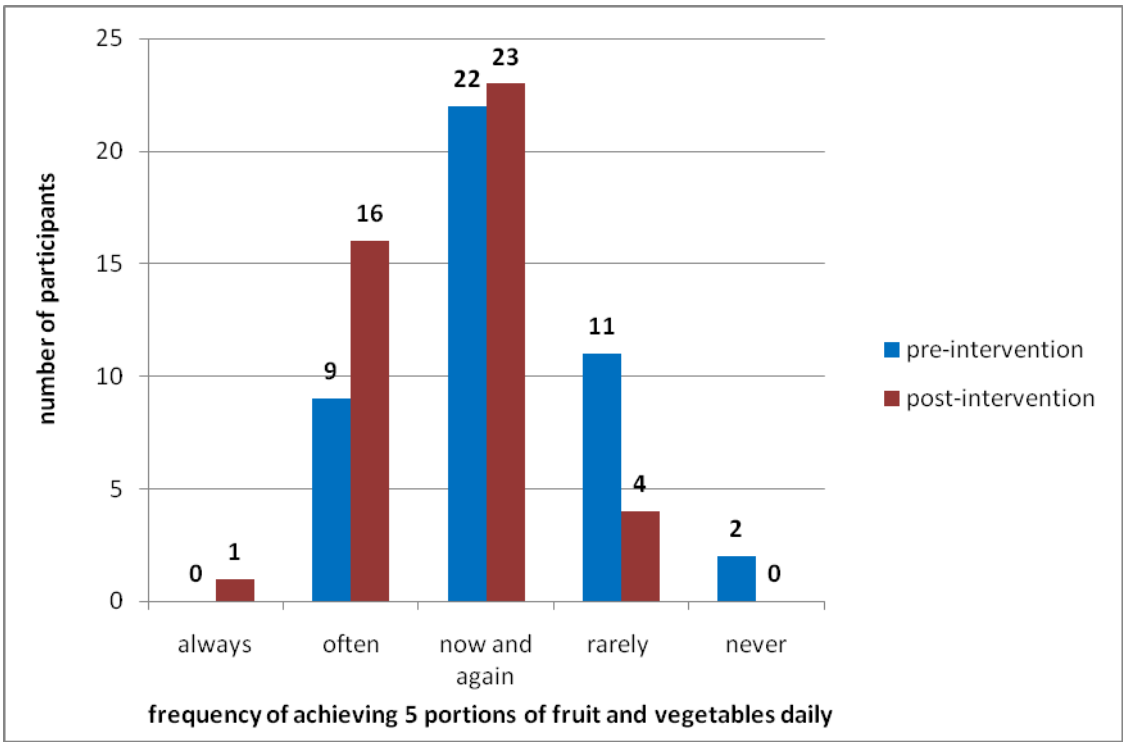
Table 4.9: A comparison of self-reported food choice scores pre- and post-intervention with level of significance (n=44)

	Pre-Intervention	Post-Intervention	
Choice	Median (min-max)	Median (min-max)	P value
score related to confidence interpreting food labels	6 (1-10)	8 (2-10)	.000
score related to importance attached to healthy eating	7 (3-10)	8 (5-10)	.009

P ≤0.05 indicates significant result

There were significant differences in each aspect of food choice. Each aspect of food choice increased from pre- to post-intervention. The median score for self-rated confidence in interpreting food labels increased from 6 to 8 (P=0.000). The median score for self-rated importance attached to eating healthy meals increased from 7 to 8 (P=0.009).

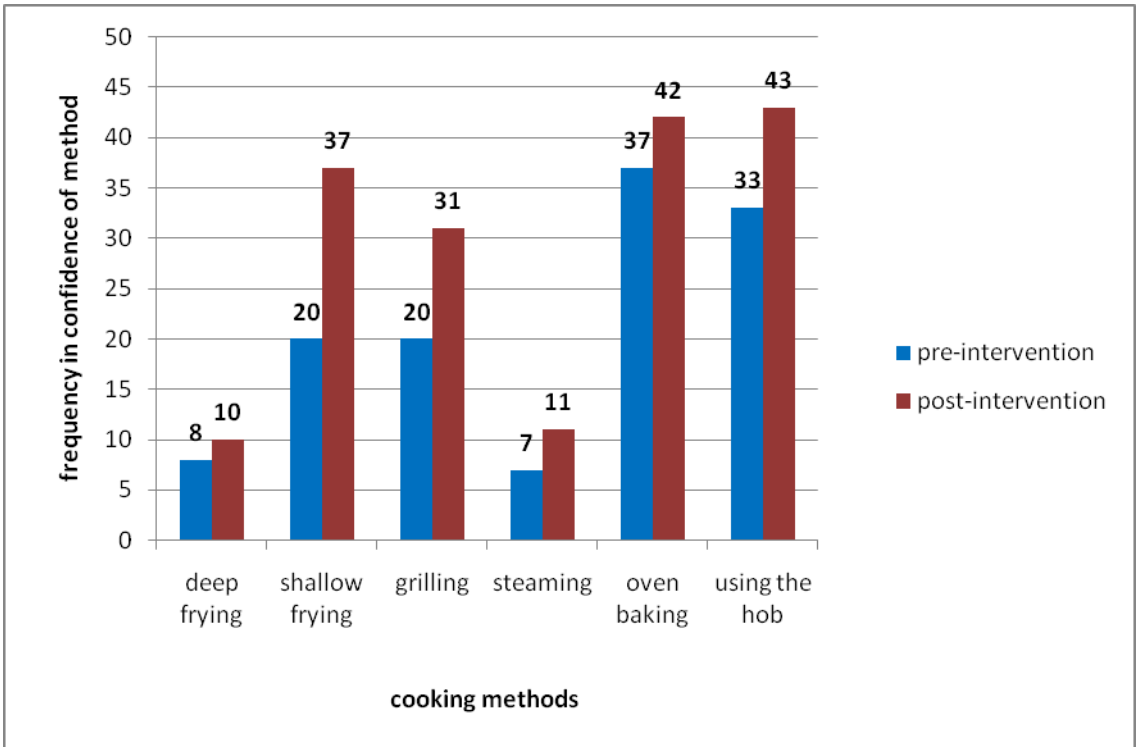
Figure 9: The participant frequency of achieving 5 fruit and vegetable portions daily pre- and post-intervention (n=44)



Prior to the intervention two individuals (4.6%) reported never achieving their 5 portions of fruit and vegetables daily. There was an improvement post-intervention with no individuals reporting the same. There was also a reduction in participants reporting achieving the 5-a-day target rarely, from 11 (25%) to 4 (9%). A small difference was seen in the participants consummating their 5-a-day now and again, a change of one individual from 22 (50%) to 23 (52.3%). 9 (20.4%) participants rose to 16 (36.4%) in saying they ate 5 portions of fruit and vegetables a day often. This was a welcomed finding alongside the one indivdual (2.3%) that reported always achieving their 5-a-day post-intervention compared to the zero pre-intervention.

It is important to note that twenty-six participants frequency if achieving their 5-a-day remained the same pre- and post-intervention. 14 individuals moved one place to a more frequent consumption of fruit and vegetables daily. 3 participants, all male, moved two places, from consuming their 5-a-day rarely to often. An odd finding was that the intervention had a negative effect on one female participant with her claiming she achieved her 5-a-day often prior to the intervention and now and again post-intervention.

Figure 10: The participant frequency of cooking methods they were confident in using pre- and post-intervention (n=44)



There were increases in the frequency of confidence of all cooking methods from pre- to post-intervention. The number of individuals confident in deep frying rose from 8 (18.2%) to 10 (22.7%) and those confident in shallow frying rose from 20 (45.5%) to 37 (84.1%). Confidence in grilling and

steaming also rose, from 20 (45.5%) to 31 (70.5%) and from 7 (15.9) to 11 (25%) respectively. The most common methods of cooking the students found confident using, oven baking and using the hob also showed increases. Participants confident in oven baking increased from 37 (84.1%) to 42 (95.5%) and those confident in using the hob rose from 33 (75%) to all but one, 43 (97.7%).

Table 4.10: A comparison of self-reported access to food scores pre- and post-intervention with level of significance (n=44)

	Pre-Intervention	Post-Intervention	
Access	Median (min-max)	Median (min-max)	P value
score related to ease of supermarket access	8 (2-10)	7 (1-10)	.003
score related to how much transport affects food shopping	8 (5-10)	8 (1-10)	.286

P ≤0.05 indicates significant result

There was a significant difference in the students' perception of ease accessing supermarkets in Chester from pre- to post-intervention. However, there was no significant difference found in how the students' mode of transport affected their food shopping. The median for self-rated ease of accessing supermarkets decreased from 8 to 7 (P=0.003) whereas the median for how much transport influences food shopping remained the same at 8 (P=0.286).

4.5 Gender Differences

Table 4.11: Gender differences pre- and post-intervention relating to confidence in cooking (n=44)

	Male			Female		
	Pre-Intervention	Post-Intervention		Pre-Intervention	Post-Intervention	
	Median (min-max)	Median (min-max)	P value (pre v post)	Median (min-max)	Median (min-max)	P value (pre v post)
score related to confidence in cooking	6 (1-8)	8 (4-9)	.004	6 (1-10)	8 (2-10)	.000
score related to how easy cooking is found to be	7 (2-8)	7.5 (5-10)	.007	6 (1-9)	7 (3-10)	.000
score related to ability to cook from fresh ingredients	5.5 (1-8)	7 (3-10)	.008	6 (1-10)	8 (3-10)	.000

P ≤0.05 indicates significant result

There were significant differences found in both sexes, more so in females, within all aspects of confidence to cook from pre- to post-intervention.

Table 4.12: Gender differences pre- and post-intervention relating to cooking skill (n=44)

	Male			Female		
	Pre-Intervention	Post-Intervention		Pre-Intervention	Post-Intervention	
	Median (min-max)	Median (min-max)	P value (pre v post)	Median (min-max)	Median (min-max)	P value (pre v post)
score related to confidence using sharp knives to prepare food	7 (5-10)	8 (5-10)	.101	7 (1-10)	8 (6-10)	.000
score related to confidence using a frying pan to cook	7 (2-9)	8 (5-10)	.026	7.5 (1-10)	8 (4-10)	.000
score related to knowing cooking times of foods	5.5 (1-9)	7 (2-9)	.005	5 (1-9)	7 (4-9)	.000

P ≤0.05 indicates significant result

Females produced statistically significant scores on all fronts of cooking skill whereas males did so in their knowledge of cooking times for food and confidence using a frying pan to cook. Only male scores for self-reported confidence using sharp knives to prepare food proved insignificant (p = 0.101).

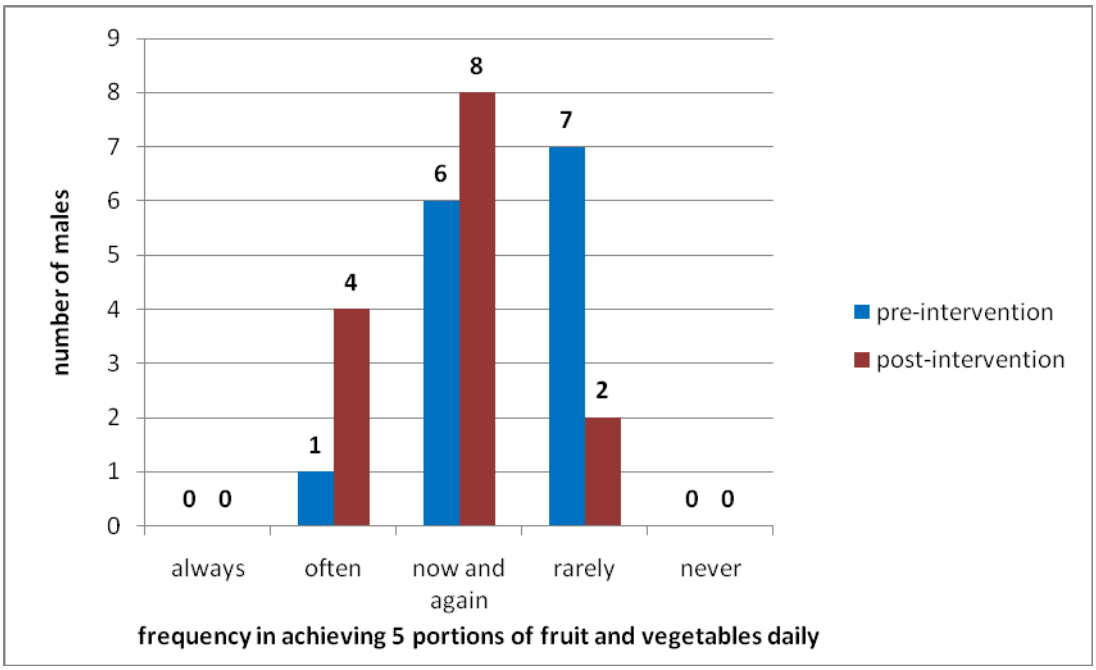
Table 4.13: Gender differences pre- and post-intervention relating to food choice (n=44)

	Male			Female		
	Pre-Intervention	Post-Intervention		Pre-Intervention	Post-Intervention	
	Median (min-max)	Median (min-max)	P value (pre v post)	Median (min-max)	Median (min-max)	P value (pre v post)
score related to confidence interpreting food labels	6 (1-10)	7 (2-10)	.039	6 (1-10)	8 (4-10)	.000
score related to importance attached to healthy eating	6 (3-10)	7 (2-10)	.031	8 (4-10)	8 (5-10)	.126

P ≤0.05 indicates significant result

Food choice scores pre- v post-intervention were statistically significant except one. The importance females attached to healthy eating did not yield a significant result (p = 0.126). This is evident in table 1.14 where the female median score for this aspect of food choice remained at 8, with little differences in the range pre- and post-intervention.

Figure 11: The frequency of achieving 5 fruit and vegetable portions daily pre- and post-intervention of males (n=14)

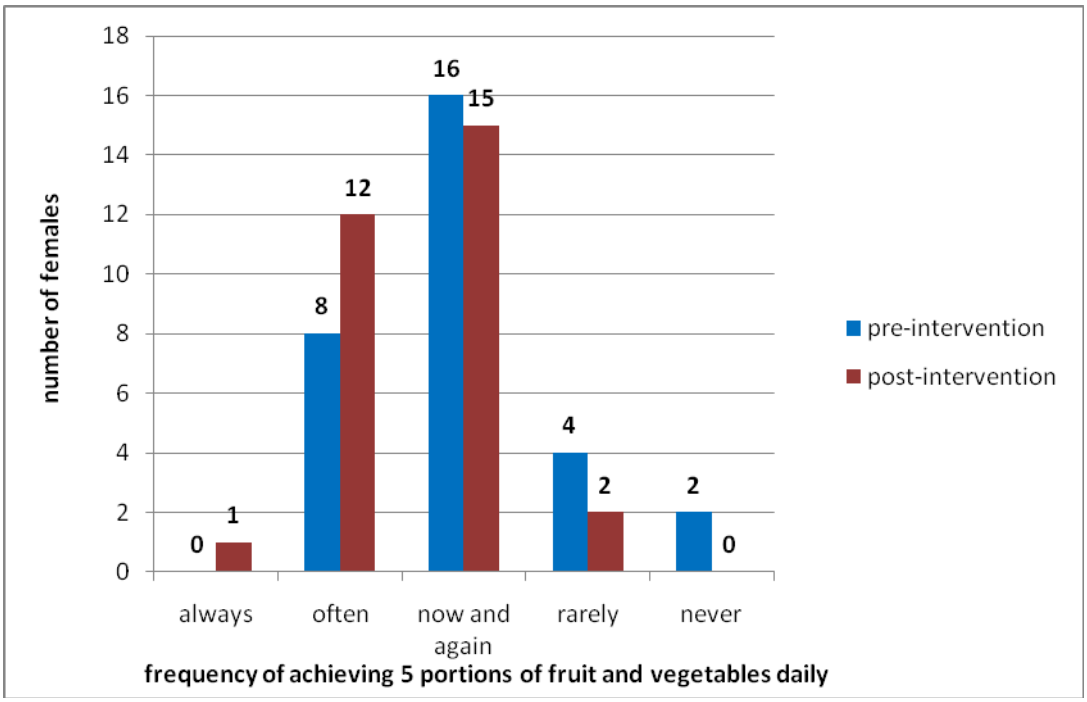


No male particiapant reported always or never achieving 5 portions of fruit and vegetables daily. There was notable shifts in more frequent consumption of fruit and vegetables. 7 out of 14 (50%) males reported acheiving their 5-a-day rarely prior to the intervention with a positive decrease to 2 out of 14 (14%) believing they rarely met the 5-a-day target. Six males (43%) increased to 8 (57%) post-intervention in reporting consuming 5-a-day now and again. 1 male (7%) believing he achieved his 5-a-day often increased to 4 (29%).

There is no mistaking there is a positive shift towards a more frequent consumption of 5 portions of fruit and vegetables daily in the male participants of the study. Even 3 males (21.4%) reported achieving their recommended intake often after attending the intervention whereas they

reported doing so rarely prior to the cooking sessions. Another 3 males (21.4%) moved one place up the scale to a more frequent consumption of fruit and vegetables. The intervention appeared to have no effect on the frequency of fruit and vegetable consumption of 8 males (57.2%).

Figure 12: The frequency of achieving 5 fruit and vegetable portions daily pre- and post-intervention of females (n=30)

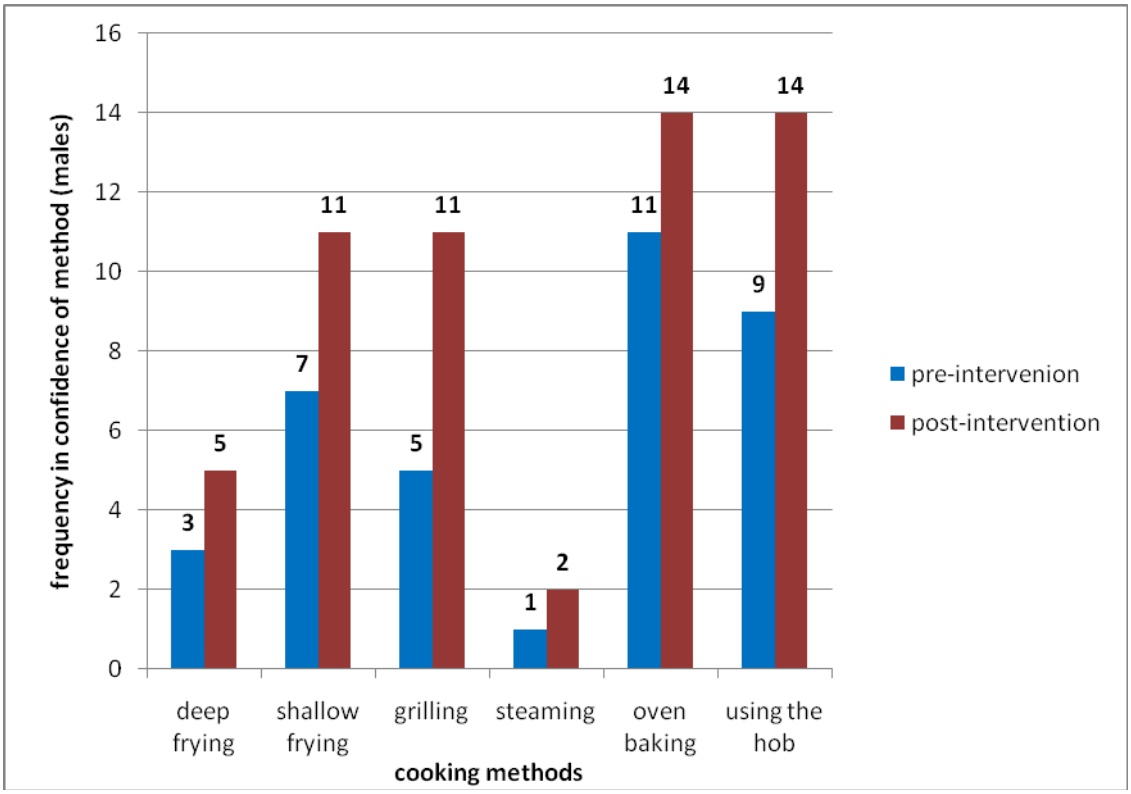


Two females out of 30 (7%) noted never achieving their 5-a-day pre-intervention with none post-intervention. Only 4 females (13%) reported rarely meeting their 5-a-day prior to the intervention with a halving to 2 (7%) post-intervention. There was little change in females reporting achieving their 5-a-day now and again, from 16 (53%) pre- to 15 (50%) post-intervention. 8 females (26%) rose to 12 (40%) in declaring they often consumed five portions of fruit and vegetables daily with 1 female participant

(3%) reporting always achieving their 5-a-day after attending the intervention where there was no female reporting this previously.

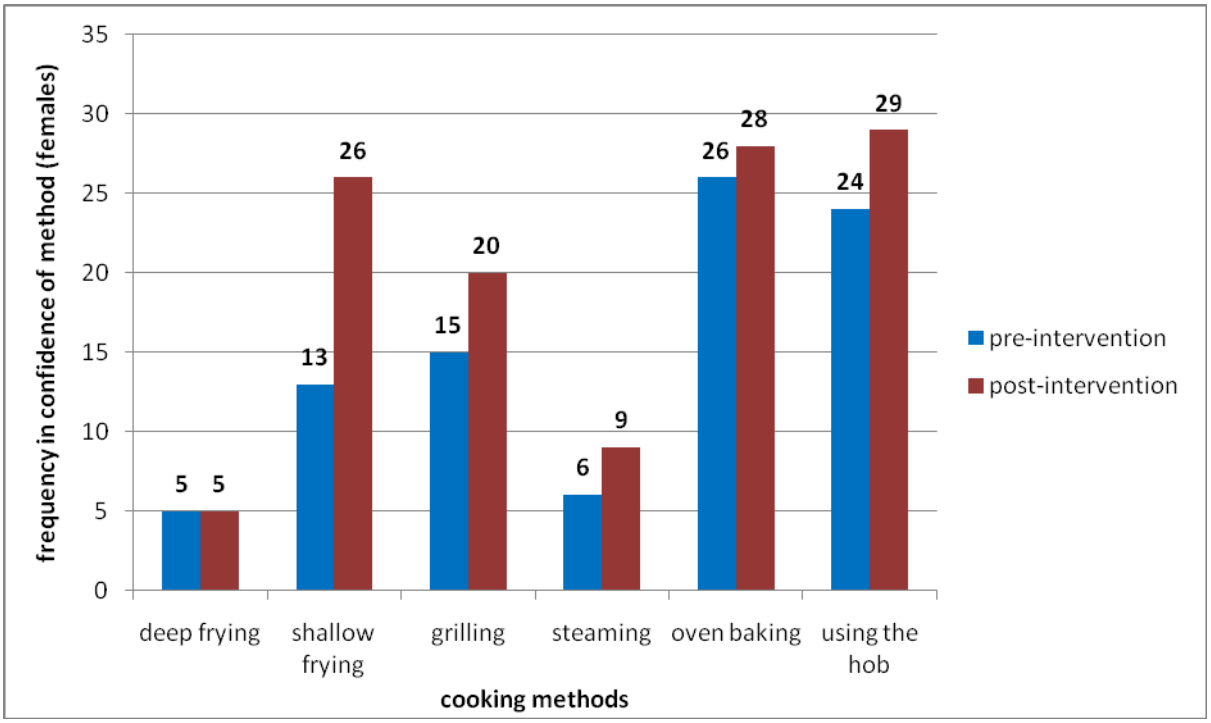
The frequency of achieving 5 fruit and vegetable portions daily in females also showed positive results. 18 females (60%) moved up the scale to a more frequent consumption of fruit and vegetables, all one place (e.g., now and again pre-intervention to often post-intervention). 11 females (36.6%) reported consuming their 5-a-day post-intervention at the same frequency as they did prior to the three intervention sessions. One female (3.33%) reported a less frequent intake of 5 portions of fruit and vegetables daily after the intervention, often to now and again.

Figure 13: The frequency of cooking methods that males were confident in using pre- and post-intervention (n=14)



Pleasingly, males were more confident using more methods of cooking after attending the three Can't cook, don't cook sessions overall. The frequency in confidence deep frying and shallow frying rose from 3 (21%) to 5 (36%) and 7 (50%) to 11 (79%) respectively. Grilling saw the greatest increase from 5 (36%) to 11 (79%) particiapants that were confident with this cooking method. Students were less confident with steaming food, however this method still saw an increase from 1 (7%) to 2 (14%). Students were most confident oven baking and using the hob, both pre- and post-intervention. Confidence oven baking increased from 11 (79%) to 14 (100%) and using the hob saw increases from 9 (64%) to 14 (100%) in the male population.

Figure 14: The frequency of cooking methods that females were confident in using pre- and post-intervention (n=30)



Females became more confident with all bar one cooking method after attending the intervention. There was no increase in females who were confident with deep frying, remaining at 5 (17%) females. However, females confident in shallow frying increased from 13 (43%) to 26 (87%). Those confident in grilling and steaming increased too, from 15 (50%) to 20 (67%) and 6 (20%) to 9 (30%) respectively. Consistent with the findings of the male participants, oven baking and using the hob were the cooking methods that females were more confident in using pre- and post-intervention. Pre-intervention, 26 (87%) females reported being confident oven baking which subsequently rose to 28 (93%). Females confident in using the hob increased from 24 (80%) to 29 (97%).

Table 4.14: Gender differences pre- and post-intervention relating to food access (n=44)

	Male			Female		
	Pre-Intervention	Post-Intervention		Pre-Intervention	Post-Intervention	
	Median (min-max)	Median (min-max)	P value (pre v post)	Median (min-max)	Median (min-max)	P value (pre v post)
score related to ease of supermarket access	8 (3-10)	8.5 (7-10)	.399	7.5 (2-10)	8 (5-10)	.001
score related to how much transport affects food shopping	6 (1-10)	6 (1-10)	.481	8 (1-10)	8 (1-10)	.468

P ≤0.05 indicates significant result

The only significant difference found in respect to food access was by females (p = 0.001) who found it easier to access local supermarkets post-intervention. Both male scores did not show any statistical significant differences.

Table 4.15: Overall level of significance between genders (n=44)

	Pre-Intervention P Value	Post-Intervention P Value
score related to confidence in cooking	**0.524**	**0.969**
score related to how easy cooking is found to be	**0.239**	**0.448**
score related to ability to cook from fresh ingredients	**0.849**	**0.691**
score related to confidence using sharp knives to prepare food	**0.499**	**0.937**
score related to confidence using a frying pan to cook	**0.867**	**0.938**
score related to knowing cooking times of foods	**0.314**	**0.708**
score related to confidence interpreting food labels	**0.683**	**0.053**
score related to importance attached to healthy eating	**0.003***	**0.081**
score related to ease of supermarket access	**0.298**	**0.689**
score related to how much transport affects food shopping	**0.929**	**0.564**

P ≤0.05 indicates significant result

The differences between the genders are shown in table 4.15. Statistical analysis describes only one significant difference between males and females in the study as a whole, the rest being largely insignificant. There

was a significant gender difference ($p = 0.003$) in the pre-intervention score of the participants' self-reported importance they attach to eating healthily. With a level of confidence, we can deduce that prior to the intervention females attached significantly greater importance to eating healthy suggesting they were more health conscious than their male counterparts (See table 4.13).

CHAPTER 5

DISCUSSION

5.1 Overview of Findings

Poor dietary habits in the university student population are common (Papadaki et al, 2007; Levy & Auld, 2004). This study aimed to evaluate changes in confidence, level of cooking skill, knowledge and dietary behaviour of first year students after participating in a cooking based educational intervention at university.

Relating to the hypotheses made prior to this study, the results indicate that participation of the intervention DID significantly increase the confidence of the students to cook for themselves. The results also signify student participation in the intervention significantly increased their knowledge of food and skills on how to cook. Behaviour change is difficult to assess, however the results of this study show students attach more importance to healthy eating and more frequently consume fruit and vegetables suggesting they are actively adopting healthier behaviours.

<u>Objective 1: evaluate the impact the intervention has made on the students in relation to food choice</u>

The results indicate students are more confident in interpreting food labels. They also attach more importance to eating healthy meals. These changes alongside the confidence to use more varied methods of cooking provide students with the attributes to make healthful decision on the foods they buy and use healthier methods to cook them.

Objective 2: evaluate the impact on improved confidence in the students to cook for themselves

Students reported to be more confident in cooking, found cooking to be easier and rated their ability to cook meals from fresh ingredients higher after participation of the intervention.

Objective 3: assess change in knowledge of food and how to cook

Changes in the knowledge of food and how to cook meals has been shown by the reported increases in confidence in the use of sharp knives, using a frying pan and knowledge of the cooking times required for some foods as well as the expansion of cooking methods the majority of students feel comfortable using.

Objective 4: assess altered student behaviour to improve health and well-being

The intervention has shown students are on the right path to improve their health and well-being through cooking. Students are more confident in interpreting food labels, equipping them with the understanding to make informed, healthy choices whilst food shopping. They have also shown a growth in the importance they attach to eating healthy meals and self-reportedly achieve the recommended 5 portions of fruit and vegetables a day more frequently post-intervention.

Both confidence and skill to cook healthy meals significantly increased from attending the intervention. There are also findings that support the hypothesis that participation in the intervention will show positive behaviour

changes towards consuming healthy foods. The main findings of the study are discussed further in this chapter.

5.2 Study Sample

Just over two thirds (68%) of the study sample was female. Larson et al (2006) and Ha and Caine-Bish (2009) also found their sample size of young adults in their nutrition-related studies to be female dominant, the latter resulting in 88% female participation. This was to be expected as current literature indicates females are more health conscious and interested in healthy eating (Levi et al, 2006). A study by Babicz-Zielinska (2001) found, as a rule, female students scored significantly higher than males in consumer-related factors influencing food choice with females rating freshness, taste, and more importantly, health and nutritional value higher than any other. However, the spread of the sample is representative of the University as a whole. Figures show out of approximately 14,500 students at the University of Chester, there is about twice as many females compared to males (Times Online, 2009).

One group of students from the same hall of residence attended the first session of the intervention but subsequently dropped out and did not complete the three sessions. This attributed to the large rate of drop-out experienced in this study. This group was pressured into attending the intervention by their hall warden who observed poor cooking skills and unhealthy food choices aplenty in that cohort. Without the presence of their hall warden, who attended the first session, this group of students did not show for any other sessions, even though feedback from the first session

was positive. This suggests the intervention may have included many students that had an interest in food and nutrition and were eager to be more confident in cooking to change their dietary behaviour, ultimately avoiding the students that would benefit the most. This is an initial limitation of the study, which are discussed in detail later in this chapter.

5.3 Confidence

Studies have concluded that cooking skills development interventions positively affect confidence in cooking (Wrieden et al, 2006; Kubota & Freedman, 2009). Evaluation of a food skills intervention aimed at altering cooking confidence, food preparation methods and dietary choices by Wrieden et al (2006) identified a small but positive effect on food choice and confidence in food preparation. From pre-intervention to a 6-month follow-up, they detected a significant increase ($P<0.05$) in the intervention subjects who reported confidence in following a recipe (67 to 90%). Kubota and Freedman (2009) reported a significant increase ($P<0.05$) in self-efficacy of food preparation in their evaluation of a 4-week hands-on basic cooking skills development programme. Like these studies, the Can't cook, don't cook intervention has shown participation of a cooking skills programme increases confidence in cooking. There was significant differences ($P=0.000$) in all aspects of cooking confidence, with self-reported confidence in cooking increasing from a median of 6 to 8 in the whole group ($p=0.000$). Nevertheless, as Kubota and Freedman (2009) noted cooking skills development programmes may not effective in improving their diets. They conclude environmental changes such as increasing grocery access are

needed too, again emphasising the numerous factors that influence eating habits, many of which have been addressed in this present study.

5.3.1 Gender Differences

There were no distinguishing differences between males and females with both showing significant differences in each aspect of confidence following the intervention. This is consistent with current literature that does not reveal any gender differences in cooking confidence (Wrieden at al, 2006; Kubota & Freedman, 2006).

5.4 Skill

Significant differences in all aspects of cooking skill were observed in the study. These findings are consistent those of Kubota and Freedman (2009), who found statistically significant gains regarding self-efficacy of food preparation. Levy and Auld (2004) also noted similar outcomes in students after their attendance of hands-on cooking classes. They also found students of their study frequently taught others what they learned in class and shared their recipes with others. This extension of the effects of the cooking classes may also happen in this study, helping to reach the students that disregarded the intervention, citing they ‘couldn’t cook’. A greater confidence in using knives to chop foods, frying pans to fry foods and knowing how long foods take to cook can help to develop the students’ cooking ability and overcome the barrier of inadequate cooking skills on food preparation, a common barrier found in students (Larson et al, 2006). This can provide them with the basic skills to experiment with different ingredients and cuisines, according to Caraher and Lang (1999). Levy and Auld (2004) also found a decrease in

participants of a cooking class eating out or having takeaway. As these meals have been predisposed as more calorific and less nutritious (Smith, McNaughton, Gall, Blizzard, Dwyer & Venn, 2009), this increase in cooking skill of the Can't cook, don't cook participants can enable them to cook at home and lead more healthful diets.

The skill level observed in the cooking sessions varied greatly. Observations in some cooking sessions showed the minority of students were far less capable and skilled. Examples include boiling whole potatoes instead of chopping them into smaller pieces, leaving the skin of an avocado in a salad, not knowing how to grate vegetables and problems peeling and chopping garlic, attempting this task in their hands as opposed to using a chopping board. The results reflected these observations with minimum pre-intervention scores of 1/10 observed in all aspects of skill (table 4.8 in chapter 4).

5.4.1 Gender Differences

Ingrained into society has been that cooking is a women's domain, with the mother, the main 'food chooser' in the household passing on cooking skills to the daughter. However, Caraher and Lang (1999) note that this trend is increasingly changing, with men expressing interest in food that has led to the undertaking of an occupation in food. Increasing numbers of chefs in top restaurants, hosting television cooking shows and food writers for magazines are men (Caraher & Lang, 1999). Sociologist's Bove and Sobal (2006) even found many aspects of the labour involved in making meals to be gender neutral in today's society.

A significant difference (p=0.000) was found in female confidence using sharp knives to prepare food, whereas it was insignificant in males (p=0.101). This result may be due to males having a greater minimum score out of ten (5/10) at baseline compared to females (1/10), owing to a smaller, insignificant change in skill perception. Differences in confidence using a frying pan to cook and knowing the cooking times of foods proved significant in both sexes (*using frying pan:* male – p=0.026. female – p=0.000.)(*cooking times*: male – p=0.005. female – p=0.000.). The results from this study imply there are little differences, if any in kitchen skills between males and females, consistent with recent research (Caraher & Lang, 1999; Bove & Sobal, 2006).

5.5 Choice

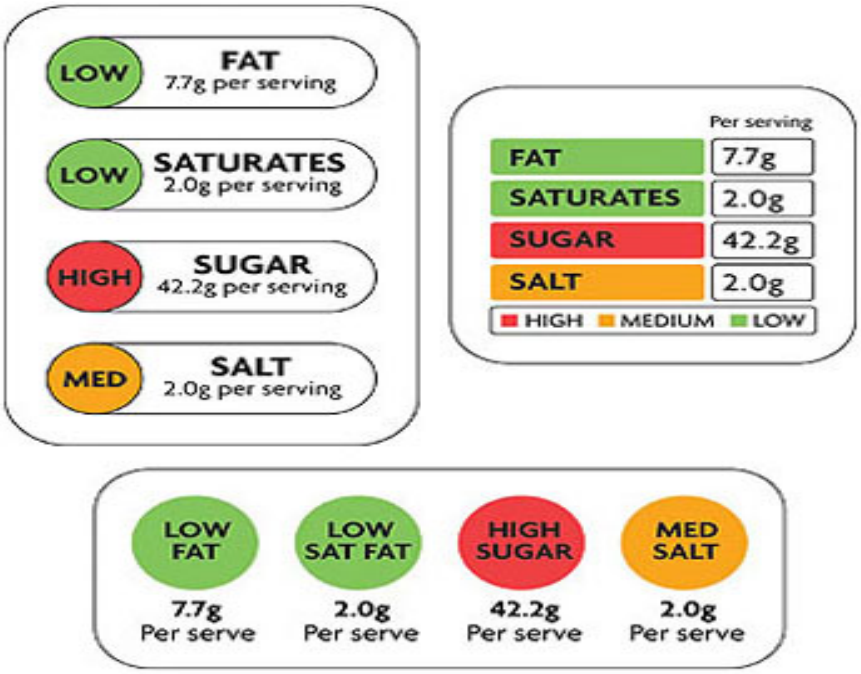
5.5.1 Interpreting Food Labels

With the array of information on food labels, it is hard to know what you should be looking for. Foods that are labelled as 'low in fat' can actually be very high in sugar. For example, ASDA's 'good for you' summer fruit cheesecake contains 4.2g of fat but 21.7g of sugar per 100g. Also, low fat margarine spreads are generally high in fat which has been shown to lead to confusion. In a UK study by Parmenter, Waller and Wardle (2000), only 15% of respondents recognised low fat spreads are actually high in fat.

Understanding food labels can help students to make healthy choices and not be duped by the tricks of the marketing trade. Differences in 'low fat' and 'reduced fat' products need to be deciphered. Low fat means a product has 3g or less fat per 100g while reduced fat means a product is 25 per cent

lower in fat than the standard product (British Heart Foundation, 2009). Students may not be aware of or understand these messages and education on food labels can help to ensure food choices made by students are clear and informed. The introduction of the ‘’traffic light labelling system’’ (figure 15) has helped to provide clear nutrition signposting on the packaging of food enabling consumers to make healthy choices.

Figure 15: The traffic light labelling system



The traffic light labelling is used alongside % guideline daily amounts (GDA) at present. However, there have been calls for the UK government to eliminate consumer confusion and solely adopt the traffic light labelling system as research has shown that traffic light labels work much better than %GDA labels across all socioeconomic groups (Faculty of Public Health, 2009). As previously discussed, moving to university is probably the first time students are exclusively responsible for their own food shopping. Research

shows first year students are unable to interpret key areas of the basic food label information (Downes et al, 2005). Food labelling may be fairly unknown to these students and as the findings from the intervention show, their participation and enlightenment from a visual tool (supplementary appendix) positively affected their confidence in interpreting food labels which is alike to Arceneaux and Fournets (1996) findings. They found education of food labels aided students' understanding of food labels. This study saw overall median scores for self-rated confidence in interpreting food labels increased significantly from 6 to 8 (P=0.000) after participation of the intervention, providing the participants with the knowledge to make informed, healthy food choices.

5.5.2 Gender Differences

Literature has shown female students use food labels more than their male counterparts (Smith, Taylor & Stephen, 1999; Downes et al, 1995) with male students having little or no prior exposure to nutritional knowledge in regards to food labelling (Misra, 2007). It was surprising to see a smaller increase in the confidence to interpret food labels in men (median=6 to 7) (P=0.039) than women (median=6 to 8) (P=0.000). These findings may suggest males already had a competent baseline confidence in interpreting food labels prior to the intervention which is contradictory to current literature reviewed. Nevertheless, males had a lower minimum value out of ten for their post-intervention confidence in food label interpretation than females (2/10 v 4/10) which implies males did not benefit from an explanation of basic food labels in the intervention thus requiring further education about them. This concurs with evidence that male students have less understanding of food labels than

females and suggests nutrition education interventions should require the tools to have a greater impact on males.

5.5.3 Importance Attached to Healthy Eating

During the intervention, students were made aware of the dangers a poor diet and lifestyle harnesses**.** Participation in the intervention significantly increased the importance the students attached to eating healthy meals (median=7 to 8) (P=0.009) although scores were, on average, high at baseline. This is consistent with the research of Levy and Auld (2004) that showed eating healthful food was important to students prior to any nutritional intervention. Attitudes towards healthful food and cooking were positively different post-intervention too. However, these findings do not necessarily mean that the students prepare healthy meals frequently or will consistently in the future. As Larson et al (2006) found, even among young adults that were heavily involved in food preparation, many of them were not meeting the recommended dietary guidelines. Evidence advises a combination of confidence and skill development in food preparation as well as the gaining of knowledge of food and barriers present to healthy eating (Ha & Caine-Bish, 2009; Wrieden et al, 2006), demonstrated in the Can't cook, don't cook sessions, are key to maximising healthy eating habits.

5.5.4 Gender Differences

Unsurprisingly, female participants attached more importance to eating healthy meals at baseline (median=8) than males (median=6). This may be a reason why the study sample was female dominant. Inter-gender comparisons found one statistically significant result (p=0.003) of the

importance attached to healthy eating pre-intervention. Females scored significantly higher than males. The data demonstrates the gender gap in the health conscious nature of the two sexes, correlating with previous studies. Yahia et al (2008) identified female students showed healthier eating habits than males, frequently consumed breakfast and had more regular eating patterns too. Wardle et al (2004) also found females have stronger beliefs in healthy eating, which they believe is partly due to a great involvement in weight control and their appearance. Beardsworth et al (2002) even states: 'women are more inclined actively to regulate food intake with health concerns in mind'. The media can be held partly responsible for these gender differences in attitudes towards healthy eating. Exploring the role of body shape in food choice, Beardsworth et al (2002) ascertained that some women want to be thinner. Many gossip magazines appear to shed a negative light on 'celebrities' that are overweight and endorse those that have lost weight. One study found that 56% of television commercials aimed at female viewers used beauty as a product appeal (Hargreaves, 2002). One example of this is the advert for the cereal Kellogg's Special K, in which a slim female is portrayed and the ''Special K Challenge'' is promoted. This ''challenge'' consists of the public being asked to consume a bowl of cereal for both breakfast and lunch or dinner for 2 weeks with the other meal of the day being nutritionally balanced, which will result in weight loss (Kellogg's, 2009). In contrast, Scott's Porridge Oats displays a strong, burly man on its cereal box, suggesting such men eat this product. The influence of these 'gendered' foods (examples shown in figure 16) on food choice cannot be ignored.

Figure 16: Examples of gendered food

5.5.5 Fruit and Vegetable Intake

This research, as a rule, found positive shifts to a more frequent intake of 5 portions of fruit and vegetables daily. This is a welcomed finding as increasing fruit and vegetables will increase the intake of key vitamins, minerals and fibre, all of which are known to be deficient in the typical diet of university students (Keller, 2009). Also, intakes of anti-oxidants and phyto-chemicals will be raised which can help maintain health. This overall gain in fruit and vegetable intake can help prevent the development of co-morbidities later on in life (Thiele et al, 2004; The Cabinet Office, 2008). However, 0% of the sample pre-intervention and only 2.3% of the cohort post-intervention reported always meeting the 5-a-day recommendation. Although there was an increase in the frequency of fruit and vegetable intake, this finding is of great concern as regular fruit and vegetable intake provides protection

against diet-related diseases such as cardiovascular disease, stroke and some cancers.

Figure 17: Five reasons to get five portions of fruit and vegetables a day according to the NHS

Five reasons to get five portions

- Fruit and vegetables taste delicious and there's so much variety to choose from.
- They're a good source of vitamins and minerals, including folate, vitamin C and potassium.
- They're an excellent source of dietary fibre, which helps maintain a healthy gut and prevent constipation and other digestion problems. A diet high in fibre can also reduce your risk of bowel cancer.
- They can help reduce the risk of heart disease, stroke and some cancers.
- Fruit and vegetables contribute to a healthy and balanced diet.

Apart from this finding, the Can't cook, don't cook study sample is not dissimilar to other study populations in regards to increasing fruit and vegetable intake. Many studies have found an increase in the consumption of fruit and vegetables in students following nutrition-related interventions. A general nutrition course to promote fruit and vegetable consumption among college students by Ha and Caine-Bish (2009) proved successful with significant increases in not only total fruit and vegetables ($p<.005$), but also fresh fruit and vegetables ($p<.005$). An evaluation of a community-based food skills intervention by Wrieden et al (2006) also detected increases in fruit and vegetable intake post-intervention, fruit consumption increasing significantly ($p<0.05$). Young adults that frequent in food preparation are more likely to meet dietary objectives for fruit ($p<.001$) and vegetables

(p<.001) (Larson et al, 2006). This supports the notion that enhancing food preparation skill and confidence can positively impact fruit and vegetable consumption in young adults, ultimately improving health and well-being. Contradictory to this, Clifford, Anderson, Auld and Champ (2009) found social learning theory cooking programs to have no significant differences in fruit and vegetable consumption pre- and post-cooking show. This, however, may be due to the intervention format of a cooking show on television with evidence showing greater impacts on nutrition-related knowledge and behaviours by way of hands-on, interactive cooking interventions (Levy & Auld, 2004; Beets et al, 2007).

5.5.6 Gender Differences

Females have been found to be predominantly more health conscious than males (Yahia et al, 2008; Wardle et al, 2004). Data from this study concurred, with a greater percentage of female participants often achieving the recommended five portions of fruit and vegetables a day than males pre-intervention *(Females: 26% v Males: 7%).* No males but 7% of females reported never achieving 5 portions of fruit and vegetables a day prior to the intervention and one female reported achieving her 5-a-day less frequently post-intervention. These are odd but concerning findings considering the vast amounts of evidence suggesting females are more health conscious than their male counterparts and eat more fruit and vegetables daily. The latter finding may be an anomaly due to the specious nature of self-reporting. Even though, on the whole, males achieved their five-a-day less frequently than females, no male reported never achieving this. This may be due to the

small sample of males present in the study or maybe because the sample of males agreeing to attend the intervention may be more interested in healthful eating compared to typical male students.

However, it's is difficult to distinguish if this study achieved a greater effect in increasing fruit and vegetable intake than other studies as portions were not disclosed due to the questionnaire design. This method with more detailed information would have provided more accurate and reliable responses. One participant may select achieving their 5-a-day now and again and do so three days a week whereas another participant could report achieving 5-a-day rarely and yet manage it three days a week too. The outcome relies on personal perception of the question. In hindsight, the Can't cook, don't cook questionnaire could have supplemented 'do you feel you achieve your recommended 5 fruit and vegetables a day...always? with 'how many portions of fruit and vegetables do you eat a day'? Alternatively, a food diary or food frequency questionnaire (FFQ) may have been a better tool to provide a more accurate assessment of fruit and vegetable intake. Some students may not conceive that tinned fruit, for example, counts towards their 5-a-day which may result in an under-reporting of consumption. The same applies for fruit juice, dried and frozen fruit and vegetables. A lack of pre-intervention knowledge into what defines a fruit or vegetable portion may have impacted on the responses of the students.

A notable limitation of the questionnaire is separate consumption patterns of fruit and vegetables were not distinguishable in the study. It is unknown if there was a greater increase in fruit intake or vegetable intake, but as Ha and

Caine-Bish (2009) found, vegetable servings doubled in their sample which implies their intervention had a greater effect on increasing vegetable intake than fruit intake. Other evidence has shown similar increases in both fruit AND vegetable consumption between sexes (Richards, Kattlemann & Ren, 2006; Larson et al, 2006). Exactly how many fruit and vegetable portions the students were achieving was not ascertained. Students should have known what a portion of fruit and vegetable equates to from the intervention but pre-intervention, students may not know how many portions they consume on average because they are unaware of what one portion actually is. This is true of the students (n=203) in a study by Chahal and Oakeshott (2007). They found many of them did not have a good understanding of portion size. Only 11% were able to guess the correct number of apricots that make up a single portion of fruit. This poor portion knowledge may have affected the pre-intervention data for this section.

5.5.7 Confidence in Various Cooking Methods

A greater repertoire of cooking skills and confidence in using different cooking methods can increase the types of food prepared. Results from this evaluation research suggest the participants have a greater confidence and knowledge of different cooking techniques following the intervention, meeting objective 3 of this study. It is clear that oven baking and using the hob were cooking methods the students had more confidence in using pre- and post-intervention (figure 10). The cooking methods the students were less confident in using were deep frying and steaming. This is not a surprise as these methods are not as commonly used as the other methods shown.

Nevertheless, attendance of the intervention did provide a gain in the students' confidence in using these cooking methods.

5.5.8 Gender Differences

There were no significant differences in the confidence of certain cooking methods between genders. Both sexes showed increases in confidence of all cooking methods except females with deep frying, which remained the same. However, Larson et al (2006) found males reported using frozen dinners and packaged convenience food more frequently than female students regardless of knowledge of cooking methods. They concluded that although both males and females have basic cooking skills, females are far more likely to make use of these skills on a regular basis. It is well known that convenience, microwaveable meals are generally high in salt, saturated fat, lower in fibre and often more expensive (The University of Manchester, 2009). Even though some convenience food is known to be healthy and thought to be unfairly labelled as junk food (Laurance, 2008), choosing to cook meals from scratch enables individuals to know exactly what is going into their meals, helping to limit consumption of salt, sugar and saturated fat, decreasing the risk of hypertension, stroke and cardiovascular disease later in life. Discussions between the cost and nutritional value of home-cooked and ready-made, shop-bought meals ensued at the end of session one, indicating benefits of cooking from scratch.

A greater understanding of food labels, attaching more importance to a healthy diet, increasing fruit and vegetable intake and increasing knowledge

and confidence to use a variety of cooking methods can all help to improve the food choices made by students and consequently their diet.

5.6 Access

It is apparent that showing the students the supermarkets that are in close vicinity of the University of Chester made no difference to them accessing these supermarkets or to their food shopping habits. There were no significant increases in self-reported ease of accessing supermarkets, in fact there was a significant decrease from a median of 8 (2-10) to 7 (1-10) (P=0.003) in the total participants. This suggests students were well aware of the shops and supermarkets near to their residence and as the study took place a few months into the first term of university, self-catered students would have been food shopping prior to the intervention and accessed supermarkets. There was no change in the influence of the mode of transport has on food shopping with the median remaining at 8 (P=0.286) in the total participants. However, the range expanded from 5-10 to 1-10 implying that after raising the students awareness of the locality of local shops and supermarkets, their mode of transport had less influence on their food shopping. There are four supermarkets that are within one mile of the University in Chester, easily accessible on foot. The results are specific to Chester and the locality of the University and its halls of residence and may well be different if the study was conducted in a different, larger city.

5.6.1 Gender Differences

There was only a significant difference in how easy females found accessing supermarkets. Males also found it easier to access supermarkets in Chester post-intervention but not to any significant degree.

5.7 Knowledge

Knowledge is intertwined with all the variables that were measured in this study. Increasing knowledge of foods and how to cook them can subsequently increase the confidence to cook these foods, develop the skills to cook and gave individuals the information to make informed healthier food choices.

5.8 Behaviour Change

The overwhelming differences in cooking confidence, skill and knowledge shown in this study's results provide the participants with the know-how to positively change their food shopping and eating behaviours. This research also exhibited the value of SLT, also found important in the intervention by Ha and Caine-Bish (2009) who believed their class-based intervention that was driven by SLT helped their student sample to meet the recommended servings of fruit and vegetables. Students in this study were able to follow recipes and use a variety of cooking methods which provided a positive outcome and reward of a tasty, nutritious meal. The volunteers in the sessions acted as role models for the participants to observe and imitate, helping to engage their hearing, smell, sight and taste. This multi-sensory involvement has been suggested to enhance the learning process (Dede,

Salzman, Loftin, Sprague, 1999). The results also support the ELM showing the great benefits of an interactive intervention which carried high involvement by the participants. This study's results also suggest the sample are at least at the contemplation stage of Prochaska and DiClemente's stages of change model, attaching more importance to health eating and reporting more frequent fruit and vegetable consumption. This is a vast improvement from the findings of Keller (2009) who found students are generally unwilling to change their unhealthy behaviours, amplifying the potential benefits of a nutrition intervention in the student population.

A Can't cook, don't cook student group was created on the social networking site, Facebook for participants of the study to join. It was the sole contact for students to ask for further information and advice on cooking. Social networking is an environment that students feel generally comfortable using and is seen as a great atmosphere to get feedback, research and insight because it is so human focused (Kelker, 2009). Widespread benefits of using social network groups have been discussed abundantly. One Facebook user comments ''I'm always updated and sometimes they help me on the questions I need to ask, and I appreciate them for doing that. I get lots of information by just joining a group'' (Magbanua, 2009). The Facebook group (in the supplementary appendix) included a list of recipes of the meals cooked during the sessions and links to the DoH and FSA web-pages with tips on healthy eating for students to reinforce what was discussed during the sessions. The group also consisted of forums and discussion boards that allowed and encouraged students to discuss issues they had around cooking

independently, if they have attempted more recipes and if so, how they got on with it, ultimately aiming to sustain the enhancement in skill and confidence developed during the intervention.

5.9 Study Limitations

However, the Can't cook, don't cook programme bears several weaknesses.

No control group was used for comparison or to control for confounding variables. There is a possibility the positive changes found were due to students having to cook for themselves to survive, being thrown in the deep end if you will, thus improving confidence, skill and knowledge irrespective of the intervention. Other confounding factors such as previous experience and seasonal variation in intake were not accounted for. A control group was omitted due to constraints within the study's timeframe.

International students were not distinguished from U.K. resident students in the study. Differences in certain norms, customs and cultures have been found to influence eating habits. 85% of participants in a study on the dietary habits of international students (Perez-Cueto, Verbeke, Lachat, and Remaut-De Winter, 2009) reported changes to their dietary habits following temporal migration abroad. A study into Asian students that had moved to the United States to attend University found the international students had changed their eating patterns, adopting a westernised diet and increasing their consumption of fats/sweets, dairy products and fruits (Pan, Dixon, Himburg & Huffman, 1999).

Convenience sampling was used rather than random sampling which limits the representativeness of the findings. This may result in the study population not representing the general undergraduate student population meaning scientific generalizations are restricted. The sample used provides a ‘snapshot’ of the student population in the University of Chester but not of students in the United Kingdom. The same study at different universities around the country, especially those who have a wider choice of courses or have a large intake of diverse students may well provide data that has many differences to this study. Also, students self-selected themselves to participate in the programme which may indicate students who took part in the intervention already had an interest or self-motivation to attend.

The study experienced a large drop-out rate (43%). Many students agreed to attend the sessions but subsequently did not show up. There were also students that attended session 1 but did not complete the full 3 sessions so their data could not be used and was omitted. Out of a possible 82 participants, only 77 were eligible to participate with only 44 students completing the full intervention programme providing pre-and post-intervention data. It is safe to say that a larger student group in the study would provide greater representative and reliable data. During the recruitment of participants for the intervention, some students showed a sense of reluctance to participate in the intervention stating that they ‘’couldn’t cook’’. With this insight, students that chose not to participate may have done so due to their lack of confidence or skill in cooking and therefore a portion of the target group may have been missed. Students opting to

disregard the intervention may also have done so due to the overwhelming choices and opportunities of clubs and societies available as a ‘fresher’. Students may feel time and effort spent joining a club or society is more fun and beneficial to them than attending cooking sessions.

The method of data collection does possess disadvantages. For example, the self-developed questionnaire was not a validated assessment tool and may have been biased towards obtaining socially desirable responses. Many limitations of the questionnaire have been previously discussed in this chapter.

Any long-term effects of the intervention were not included in the study design. Avenell, Sattar and Lean (2006) state that the key elements to successful behaviour change are frequent contact and support. Post-intervention contact and support was very infrequent which could have limited the sustainability of positive changes made by the students. The only contact participants of the study had with the organisers and volunteers of the intervention was via a student group on the social networking site, Facebook. This did however exclude students that did not have a Facebook account.

In spite of these limitations, the results from the evaluation add to existing evidence that a hands-on cooking intervention in the student population positively affects confidence, skill and knowledge to cook. Although there is limited evidence suggesting these changes influence food choice, it is almost certainly not going to have a disadvantageous effect on healthy choices.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The evaluation research demonstrates the benefits of nutritional interventions in developing the tools needed to cook and eat nutritious food as part of a healthy, balanced diet.

Past empirical evidence and pre-intervention data from this study suggest first year University students lack nutritional knowledge, appropriate kitchen skills and confidence to cook healthy meals for themselves. This can manifest itself into poor dietary habits that can be maintained for life. Thus implying there is a need to improve the dietary choices of students which can be achieved through educational interventions concerning cooking and healthy eating.

Participation in the Can't cook, don't cook intervention led to favourable changes in the confidence students had when it came to cooking nutritious meals and the skill they possessed to prepare them. This evaluation also showed the students became more knowledgeable when it came to the shopping and cooking of food. For example, students were shown to have better knowledge of food labels and the know-how to be confident using a wider range of cooking methods.

6.2 Recommendations for future research

The pre-intervention findings from this evaluation add weight to already published literature describing the poor cooking and eating habits of students advocating the requirement of public health policies and initiatives to be, in part, targeted at students at university. The successful outcomes of this research provide affirmation that hands-on cooking sessions are a valuable tool to improve the confidence, skill and knowledge of students to cook healthy meals. This can then be easily imitated in Universities nationwide providing a beneficial service helping students take steps to overcome the barriers they face to healthy eating and improve their health and well-being.

There is scope to explore the dietary habits of University students and other barriers to healthful eating further and provide subsequent interventions to help vanquish such barriers.

More comprehensive evaluation approaches would provide a better understanding on the impact of cooking sessions. These include obtaining knowledge of the frequency of food intake prior to an intervention or tracking participants for a longer period of time after the intervention (i.e. follow up). As Kubota and Freedman (2009) concluded, cooking skills interventions for students can be used to increase cooking confidence but may not be effective at improving eating habits of these students. Future research that includes a longitudinal approach with follow up data collection would be able to examine any long-term changes in dietary behaviour.

The use of a control group is recommended in future practice to control for any confounding factors and its ability to enable the researcher to make direct comparisons between the groups. A control group would also help to differentiate between those who attended an educational intervention and those who were possibly forced to learn to cook because they had to.

Alongside this, running an intervention within the first month of term and specifying the ethnicity of participants would provide more accurate baseline data. The gender differences in attendance of, and the data collected in this study illustrates future studies should concentre on nutrition interventions that are gender-tailored.

A more detailed method of analysis, (i.e. FFQ or validated questionnaire) would provide depth to the findings, allowing for more precise connotation. A future study comparing catered and non-catered students or student and non-student would also be fruitful.

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APPENDICES

Appendix A – Session Plans

Session plan 1

Can't Cook? Don't Cook!

Trainer	Lloyd	**Date**		**Room**	Food Lab and Cloisters
Programme/ Topic	Can't cook? Don't Cook!	**Time**	4-6	**Duration**	2 Hours
Aim	• Identify the reasons for participating in the sessions • Identify confidence and knowledge students have when cooking foods. • Observing different food groups and enabling the student to identify nutrients included in the meal.				

Timing	**Objectives/ Learning outcomes**	**Resources**	**Activities and Key learning points**
5 min's 15 min's	Introduction Aims and objectives of the sessions. • Ice breaker- *Touchy, feely, smelly fruit and vegetables* • Interacting with other students	Cloisters room Cloisters room	• Intervention to increase confidence in cooking • Knowledge of food • Enhance positive behaviour towards healthier meals/ food products

15-20 min's	• Identifying unusual fruits/ vegetables and increasing knowledge and communicating skills Group discussion: Why are you here? Point out top ten items in food cupboard- common foods among the groups Identify what students include as their top ten food items in their cupboard. This will enable the intervention to adapt to the students and cook foods that they use and to develop and introduce new items to the meal.	10 items of unusual fruit and vegetables Blind folds Flip chart Work sheets Cloister room Flip chart & markers Post-its/ stationary	• From the work sheet, work in pairs, one is blind folded and has to describe the fruit/ vegetable. • The results at the end of the activity. This increases communicating skills and increases knowledge. • Identify barriers which students face when accessing foods and cooking? • Looking at food choice and solutions to overcome barriers • Questionnaires completed before the intervention has started • Awareness in a balanced diet

			To show students where they can do their food shopping and how to get there, etc.
	Pre questionnaire		
			Work in groups at different stations making and preparing pizzas.
	Eat well plate-		
5 min's	Brief presentation on the eat well plate		
		Questionnaires/ stationary	
10 min's	Map of area indicating nearest supermarkets.		Increase knowledge in identifying labels and looking at nutrient content compared to other products. Raising awareness in reading labels.
		Poster showing the eat well plate	
		PowerPoint + handout	
	Practical		
40 mins	Pizza using bread sticks, ciabatta, tiger bread, oatmeal bread with		Observing prices from local supermarkets in which students will be accessing food. This will raise

	variety of toppings which the students will chop and use knife skills. Salad- green bean, coleslaw, mixed, cous cous & potato salad with homemade dressings.		awareness and aid the student to purchase food from cheaper shops locally.
15 min's During cooking	Labelling and costing A brief overview of the traffic light food labelling. A list of ingredients and costs will be on each station from three supermarkets- Tesco, Morrison's & Aldi. Comparing prices of ingredient. Evaluation of session on post-it notes. Student input on what they want to cook in future sessions.	Food skills lab Cooking facilities and equipment Aprons Step by step recipes. Products which includes traffic light system. Work sheet	

Session plan 2

Can’t Cook? Would Like to Cook!

Trainer	Lloyd	**Date**		**Room**	Food lab and Cloisters
Programme/ Topic	Can’t cook?! Like to cook?!	**Time**	4-6	**Duration**	2 Hours
Aim	• Focus on specific nutrients to increase/ decrease in diet and use two key commodities, understanding and adapting				

Timing	**Objectives/ Learning outcomes**	**Resources**	**Activities and Key learning points**
5 min’s	Introduction Aims and objectives of the sessions. Cooking bolognaise mix and opening an option for the students to choose from the mix what to cook next- there choice.	Cloisters room Cloisters room Flip chart Work sheets	• Intervention to increase confidence in cooking • Knowledge of food • Enhance positive behaviour towards healthier meals/ food products This aims to improve communication skills and knowledge.

10 min's 10 min's 60-100 min's	Ice breaker- *who wants to be a millionaire style quiz.* • Interacting with other students Practical Cooking a bolognaise mixture from mince or quorn base- adding various vegetables Option to what the students want to cook: Spaghetti bolognaise- wholemeal pasta Cottage pie Lasagne	Cloister room Posits/ stationary Food skills lab Cooking facilities and equipment Aprons Step by step worksheets of how to cook the food.	Students will make a basic mince mixture that can easily be made into various other dishes. Students will be told how to portion food, to eliminate food waste and storage options (ie, freezing meals).

5 min's	Pasties Accompanied with Garlic bread Costing of the foods cooked from Tesco. Morrison's and Aldi.		

Session plan 3

Can’t Cook? Will cook!

Trainer	Lloyd	**Date**		**Room**	Food Lab and Cloisters
Programme/ Topic	Can’t cook?! Will cook!	**Time**	4-6.	**Duration**	2 Hours
Aim	• Extend culinary skills • Introduce fish- commonly poorly rated from the literature • Portion size				

Timing	**Objectives/ Learning outcomes**	**Resources**	**Activities and Key learning points**
5 min’s	Introduction Aims and objectives of the sessions. Discuss from the sessions found that fish is not commonly cooked. Trying out new recipes with the students.	Cloisters room	• Intervention to increase confidence in cooking • Knowledge of food • Enhance positive behaviour towards healthier meals/ food products

10 min's	Food portion size- Importance of serving the right size	Food skills lab	Using a range of fish- and using different recipes
90 min's	Practical Fishy Number 3 types of fish, parsley sauce and different types of toppings- sweet potato and potato sliced, grated cheese, parsley sauce and peas, green beans and sweet corn. Salmon, broccoli, peas, sweet corn, parsley sauce, sweet potato	Food skills lab Cooking facilities and equipment Aprons Step by step worksheets of how to cook the food.	

	and potatoes sliced & grated cheese. Tuna fish cakes Costing of the foods cooked from Tesco. Morrison's and Aldi. Comparisons of ready made meals verses home made. Students taste, key nutrients and compare cost with their product they each have made	Food skills lab Food skills lab Calculator Fish pie- ready meal	Comparing costs Increase knowledge in identifying labels and looking at nutrient content compared to other products. Raising awareness in nutrient content in ready meals. Observing prices from local supermarkets in which students will
5 min's 5-10 min's			

10- 15 min's	Evaluation post-it notes. Post questionnaire	Post questionnaire	be accessing food. This will raise awareness and aid the student to purchase food from cheaper shops locally. .

Appendix B – Ethical Approval

Faculty of Applied and Health Sciences
Research Ethics Committee

01 December 2009

Dear Lloyd

Study title: **An evaluation of an educational intervention to improve the confidence, knowledge and skills of first year students to cook healthy food.**

FREC reference: **372/09/LB/BIOL**
Version number: **2**

Thank you for sending the above-named application to the Faculty of Applied and Health Sciences Research Ethics Committee for review.

The application has been considered on behalf of the Committee by Steve Fallows as Lead Reviewer and reported to the Faculty Research Ethics Committee.

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form and supporting documentation.

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Application Form	2	November 2009
Response to FRECs request for clarifications	1	November 2009
Summary CV for lead researcher	-	November 2009
Sample size calculation	2	November 2009
Screening questionnaire	2	November 2009
Pre-intervention questionnaire	2	November 2009
Post-intervention questionnaire	2	November 2009
Participant information sheet	2	November 2009
Consent form	2	November 2009
Reference list	2	November 2009
Advertisement poster	-	November 2009

With the Committee's best wishes for the success of this project.

Yours sincerely,

Cynthia Burek

Prof. Cynthia Burek
Chair, Faculty Research Ethics Committee

Enclosures *Standard conditions of approval.*

c.c. Supervisor
FREC Representative

Appendix C – Screening Tool

Can't cook? don't cook!...GO COOK!

Full Name …….

1. Gender A) Male B) Female

2. D.O.B……..

3. Degree programme

……

4. Qualifications: A levels / Diploma's (Grades not required)

……
……

5. Do you live in Chester? Y/N

6. Do you live in rented accommodation? Y/N

7. Name of your accommodation:

……

8. Street name:

……

9. Do you have to cook for yourself? (self-catered) Y/N

10. If yes, please circle the following that the kitchen is equipped with:

Oven Microwave Grill Cooker hob

11. If a cooker is used: Is it electricity or gas? Please circle Gas / Electricity

12. What methods do you commonly use? Please circle

Grilling Deep Frying Shallow frying Baking Steaming

13. With how many people do you share your kitchen? ……

14. On a scale of 1 – 10 (1 being the lowest, 10 being the highest How do you rate your confidence in cooking for yourself on a daily basis?

1 2 3 4 5 6 7 8 9 10

14a.Why did you rate yourself with that number?

……
……

15. Do you have any known food allergies? If so, please specify below:

……
……

16. If participating in the cook and eat sessions; please circle your preferred day?

Monday evening (4-6) Tuesday evening (4-6) Wednesday (2-4)

Wednesday (5-7) Thursday (5.30 – 7.30)

17. What is your preferred time to eat in the evening?

……..

18. What is your favourite takeaway?

……

19. Do you prefer white or brown Bread?

…….

20. What is your least favourite food/ meal?

……

20a. Why?

……

21. Do you prefer: Sweet or Savoury foods?

……

Thank you for your time!

Phone number:……

Email:……..

Appendix D – Pre-Questionnaire

Can't cook? …don't cook!

Pre Intervention Questionnaire

1. General details

Name (please insert nickname or other identifier)

……..

A) Male **B) Female** (please circle)

Age……..

2. Confidence in cooking

1) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How do you rate your confidence in cooking?

1 2 3 4 5 6 7 8 9 10

2) On a scale of 1 – 10 (1 being the hardest, 10 being the easiest), How easy do you find cooking to be?

1 2 3 4 5 6 7 8 9 10

3) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How do you rate your ability to cook meals from fresh ingredients?

1 2 3 4 5 6 7 8 9 1

3. Cooking skills

4) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How confident are you in using sharp knives to chop food?

1 2 3 4 5 6 7 8 9 10

5) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How confident are you in using a frying-pan to fry foods?

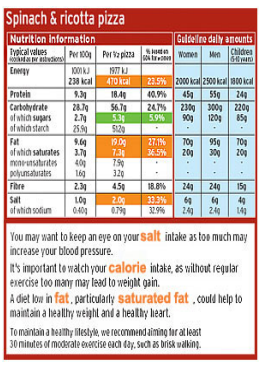
1 2 3 4 5 6 7 8 9 10

6) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How knowledgeable do you think you are in knowing the cooking times for the food you cook?

1 2 3 4 5 6 7 8 9 10

4. Food choice

7) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How confident are you at interpreting food labels?


Spinach & ricotta pizza

Nutrition Information

Typical values (as sold)	Per 100g	Per ½ pizza	% based on GDA for a child	Guideline daily amounts: Women	Men	Children (5-6 years)
Energy	1001kJ 238 kcal	1977 kJ 470 kcal	23.5%	2000 kcal	2500 kcal	1800 kcal
Protein	9.3g	18.4g	40.9%	45g	55g	24g
Carbohydrate	28.7g	56.7g	24.7%	230g	300g	220g
of which sugars	2.7g	5.3g	5.9%	90g	120g	85g
of which starch	25.9g	51.2g	-	-	-	-
Fat	9.6g	19.0g	27.1%	70g	95g	70g
of which saturates	3.7g	7.3g	36.5%	20g	30g	20g
monounsaturates	4.0g	7.9g	-	-	-	-
polyunsaturates	1.6g	3.2g	-	-	-	-
Fibre	2.3g	4.5g	18.8%	24g	24g	15g
Salt	1.0g	2.0g	33.3%	6g	6g	4g
of which sodium	0.40g	0.79g	32.9%	2.4g	2.4g	1.4g

You may want to keep an eye on your **salt** intake as too much may increase your blood pressure.

It's important to watch your **calorie** intake, as without regular exercise too many may lead to weight gain.

A diet low in **fat**, particularly **saturated fat**, could help to maintain a healthy weight and a healthy heart.

To maintain a healthy lifestyle, we recommend aiming for at least 30 minutes of moderate exercise each day, such as brisk walking.

1 2 3 4 5 6 7 8 9 10

8) On a scale of 1 – 10 (1 being the least, 10 being the most), How much importance do you attach to eating healthy meals?

1 2 3 4 5 6 7 8 9 10

9) How important are the following to you in deciding what you eat? (Please tick one answer for each question)

	very important	important	neither	unimportant	very unimportant	don't know
My own cooking skills						
My likes and dislikes						
What my friend eat						
The cost in relation to what I have spent on food						
My knowledge on ways of preparing food						
Time I have available to spend preparing food						
The quality of fresh fruit and vegetables available						

Are there any other things that are important in influencing what you decide to eat? If so, please write them down here.

……
……

10) Please list your top 3 foods that you feel are essential for a student's cupboard, fridge or freezer?

……

……

……

11) Do you feel you achieve your recommended 5 fruit and vegetables a day? (please circle)

always often now and again rarely never

12) What cooking methods are you confident in using? (please circle)

deep frying shallow frying grilling steaming oven baking using the hob

5. Food access

13) On a scale of 1 – 10 (1 being the least, 10 being the most), How easy do you find it accessing supermarkets to do food shopping?

1 2 3 4 5 6 7 8 9 10

14) On a scale of 1 – 10 (1 being the least, 10 being the most), How much does your mode of transport affect your food shopping?

1 2 3 4 5 6 7 8 9 10

Thank you for your time! GO COOK!

Appendix E – Post Questionnaire

Can't cook? …don't cook!

Post Intervention Questionnaire

1. General details

Name (please insert nickname or other identifier)

……

A) Male B) Female (please circle)

2. Confidence in Cooking

1) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How do you rate your confidence in cooking?

1 2 3 4 5 6 7 8 9 10

2) On a scale of 1 – 10 (1 being the hardest, 10 being the easiest), How easy do you find cooking to be?

1 2 3 4 5 6 7 8 9 10

3) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How do you rate your ability to cook meals from fresh ingredients?

1 2 3 4 5 6 7 8 9 10

3. Cooking skills

4) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How confident are you in using sharp knives to chop food?

1 2 3 4 5 6 7 8 9 10

5) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How confident are you in using a frying-pan to fry foods?

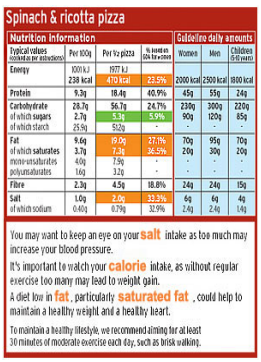
1 2 3 4 5 6 7 8 9 10

6) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How knowledgeable do you think you are in knowing the cooking times for the food you cook?

1 2 3 4 5 6 7 8 9 10

4. Food choice

7) On a scale of 1 – 10 (1 being the lowest, 10 being the highest), How confident are you at interpreting food labels?


Spinach & ricotta pizza

Nutrition Information				Guideline daily amounts		
Typical values (as sold) per 100g:	Per 100g	Per ½ pizza	% (as sold) as GDA for ½ pizza	Women	Men	Children (5-6 years)
Energy	1001kJ 238 kcal	1977 kJ 470 kcal	23.5%	2000 kcal	2500 kcal	1800 kcal
Protein	9.3g	18.4g	40.9%	45g	55g	24g
Carbohydrate	28.7g	56.7g	24.7%	230g	300g	220g
of which sugars	2.7g	5.3g	5.9%	90g	120g	85g
of which starch	25.9g	51.2g	-	-	-	-
Fat	9.6g	19.0g	27.1%	70g	95g	70g
of which saturates	3.7g	7.2g	36.0%	20g	30g	20g
mono-unsaturates	4.0g	7.9g	-	-	-	-
polyunsaturates	1.6g	3.2g	-	-	-	-
Fibre	2.3g	4.5g	18.8%	24g	24g	15g
Salt	1.0g	2.0g	33.3%	6g	6g	4g
of which sodium	0.40g	0.79g	32.9%	2.4g	2.4g	1.4g

You may want to keep an eye on your **salt** intake as too much may increase your blood pressure.
It's important to watch your **calorie** intake, as without regular exercise too many may lead to weight gain.
A diet low in **fat**, particularly **saturated fat**, could help to maintain a healthy weight and a healthy heart.
To maintain a healthy lifestyle, we recommend aiming for at least 30 minutes of moderate exercise each day, such as brisk walking.

1 2 3 4 5 6 7 8 9 10

8) On a scale of 1 – 10 (1 being the least, 10 being the most), How much importance do you attach to eating healthy meals?

1 2 3 4 5 6 7 8 9 10

9) Please respond to the following statements: (Please tick one answer for each question)

	strongly agree	agree	undecided	disagree	strongly disagree
I am more confident in cooking					
I am more aware of how to eat a healthier diet					
I am more aware of how to adapt recipes to make them healthier					
I am more aware of how to shop for healthy choices on a low budget					
I am more aware about cooking healthy meals					
My eating habits have changed or will change to improve the health of my diet					
My shopping habits have changed or will change to improve the health of my diet					

10) Do you feel you achieve your recommended 5 fruit and vegetables a day? (please circle)

always often now and again rarely never

11) What cooking methods are you confident in using? (please circle)

deep frying shallow frying grilling steaming oven baking using the hob

5. Food access

12) On a scale of 1 – 10 (1 being the least, 10 being the most), How easy do you find it accessing supermarkets to do food shopping?

1 2 3 4 5 6 7 8 9 10

13) On a scale of 1 – 10 (1 being the least, 10 being the most), How much does your mode of transport affect your food shopping?

1 2 3 4 5 6 7 8 9 10

14) Do you agree / disagree with the following statement: *'Any changes would have happened anyway without attending the can't cook? don't cook session'*.

Strongly agree Agree Undecided Disagree Strongly disagree

Thank you for your time!

Appendix F – Participation Information Sheet

Can't cook, don't cook evaluation

PARTICIPANT INFORMATION SHEET

An evaluation of an educational intervention to improve the confidence, knowledge and skills of first year students to cook healthy food.

Thank you for attending the can't cook?... don't cook! sessions. Please take time to read the following information carefully, and discuss it with others if you wish. Ask the research team if there is anything that is not clear or if you would like more information.

What is the purpose of the research?
The purpose of the can't cook?...don't cook! project is to introduce or develop kitchen and budgeting skills for students living independently. Knowledge of nutrition, health and lifestyle will be enhanced through fun, practical sessions designed especially for the student population. The researchers will evaluate the information provided by you during the can't cook? ...don't cook! sessions to see if they improve the confidence, skills, knowledge and attitudes of first year students towards healthy eating.

Do I have to take part?
It is up to you to decide whether or not to take part in the evaluation. If you decide to take part you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the availability of information regarding this study in any way.

What will happen to me if I take part?
If you decide to take part, you will be given this information sheet to keep and asked to sign the consent form. You will be asked to fill in two questionnaires (each taking no more than 5 minutes to fill in), one at the start of the first session and another at the end of the third session. Information from these questionnaires will be used to evaluate the sessions. We will use the information to see if what we are doing has helped you to gain confidence in cooking and knowledge of food and healthy eating.

What are the possible benefits of taking part?
This study will help to improve knowledge of the importance of a healthy balanced diet. Skills such as food preparation, cooking and cost-effective food shopping for students will hopefully be enhanced during the sessions. The evaluation research will hope to show sessions like these work, are effective amongst students and can be expanded for future studies.

What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks foreseen in taking part in the research. Health and safety practice will be adhered to at all times during the practical sessions.

What if something goes wrong?
If you wish to complain or have any concerns about any aspect of the way you have been approached or treated during the course of this study, please contact: Professor Sarah Andrew, Dean of Faculty of Applied and Health Science, University of Chester, Parkgate Road, Chester, CH1 4BJ. (Phone: 01244 513055. Email: s.andrew@chester.ac.uk).

Will my taking part in the study be kept confidential?
All information which is collected about you during the course of the evaluation research will be kept strictly confidential so that only the researcher carrying out the evaluation research will have access to such information.

What will happen to the results of the research study?
The results will be written up into a research report for a MSc dissertation. Individuals who participate will not be identified in any subsequent report or publication.

Who is organising and funding the research?
The evaluation research is funded by The Department of Biological Sciences at the University of Chester, Student Guidance Service and Human Resources as part of the food4life group who will be involved in organising and carrying out the study.

Who may I contact for further information?
If you would like more information about the evaluation research before you decide whether or not you would be willing to take part, please contact:

Lloyd Bristow

@chester.ac.uk

Supervisor: Dr Basma Ellahi

b.ellahi@chester.ac.uk

Thank you for your interest in this research

Appendix G – Consent Form

University of Chester

Title of Project: An evaluation of an educational intervention to improve the confidence, knowledge and skills of first year students to cook healthy food.

Name of Researchers: Lloyd Bristow

Please initial box

- I confirm that I have read and understood the participant information sheet for the above study and have had the opportunity to ask questions. ☐

- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and without my legal rights being affected. ☐

- I agree to take part in the above study. ☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Person taking consent (if different from researcher)	Date	Signature

_____	_____	_____
Researcher	Date	Signature

Can't cook, don't cook?

Food 4 Life

Just arrived in your accommodation?

First year nerves?

Worried about how you are going to manage your finances?

Very little in your food cupboard?!

Had very little or no experience of cooking for yourself?

The Department of Biological Sciences at the University of Chester runs food and nutrition programmes for people like you. We are offering you a unique opportunity to meet other people, learn to cook for yourself cheaply and well and eat the products by attending "hands-on cook and eat" sessions which will help you improve your diet available on campus.

The sessions will provide an opportunity for you to pick up advice and tips for eating well and managing the usual student issues such as money!

The course is run by students for students and will involve using common foods you love to eat. The most important outcome of the sessions is that you are able to cook simple meals for yourself cheaply, quickly and that taste good.

So… If you see yourself surviving on junk food but don't want to live on lettuce leaves this course is for you!

The sessions will run one afternoon or evening, once a week for three weeks and start the first two weeks of term. The course will be run at the Chester campus in a purpose built facility. The course is priceless (literally there is no cost) and you don't even have to pay a penny, as ingredients will be provided.

So what are you waiting for?

Can't cook, Don't Cook?! GO COOK!

To find out more and sign up for a place contact Jess (details below) asap as places are filling up fast.

Contact:
Jess Morgan Tel: 07843427367
Email: Jessmary1@hotmail.co.uk

University of Chester